

The MINING CONGRESS JOURNAL

Volume 11

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Annual Convention Edition

Mining Industry Dependent Upon Protective Tariff
Tax Division Defends Discovery Depletion
Prospects for Increased Silver Production
California Mines Men Work Out Betterment Program
Stability of Operation and Employment in Coal
Anthracite Operators' Real Attitude Toward Public
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New Flotation Mill U. S. S. R. and M. Co.
Rubber Linings for Wet Grinding Ball Mills
Mechanical Loading in Central Pennsylvania
Long Face Conveyors at Sweetwater Mine
Legislative Forecast
The Nation's Viewpoint
News of the Mining Field
Practical Operating Men's Department

Contributors:

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Wilson, Elmer E. Paxton, E. W. Parker, W. H. Lindsey, L. E. Girard,
C. A. Lemke, B. W. Rogers, O. G. Sharrer, Glen A. Knox.

Year In and Year Out



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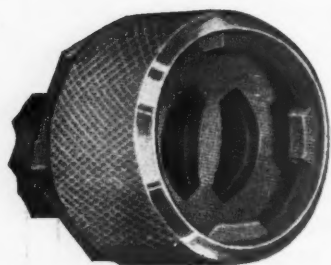
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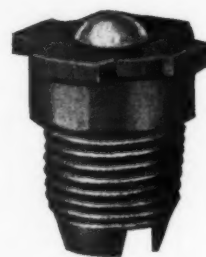
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THE MINING CONGRESS JOURNAL

DECEMBER, 1925

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METAL

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Rubber Linings for Wet Grinding Ball Mills

COAL

Mechanical Loading in Central Pennsylvania
Long Face Conveyor Methods at Sweetwater Mine

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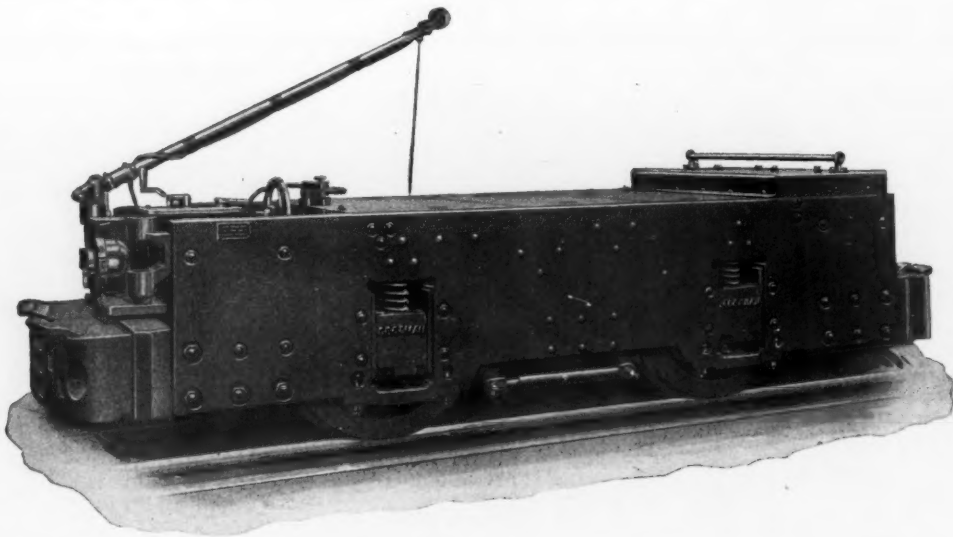
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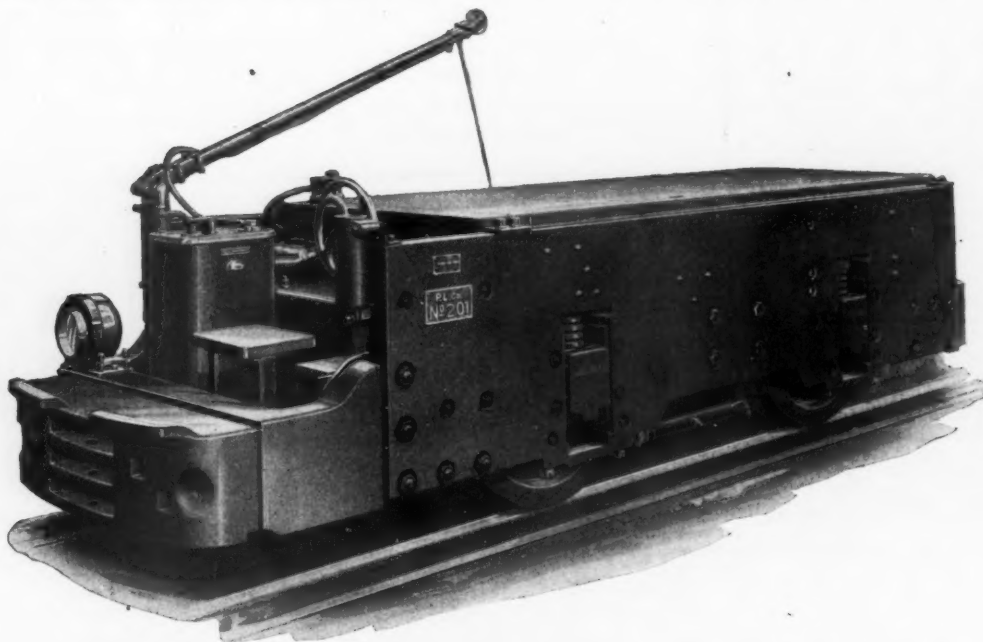
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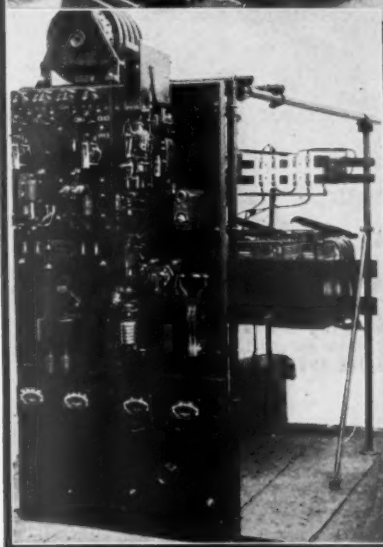
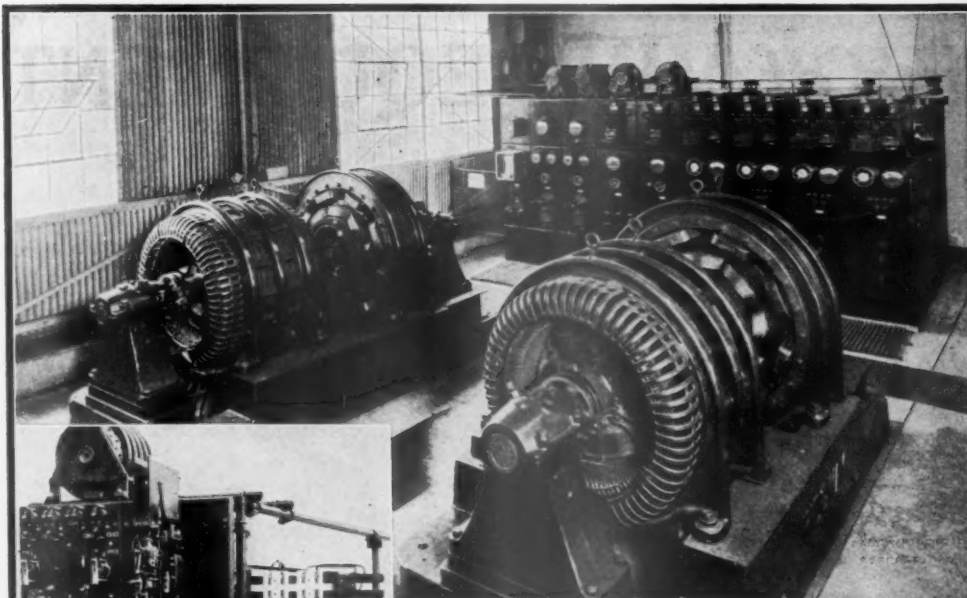


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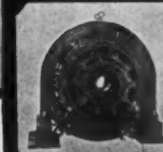
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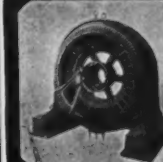
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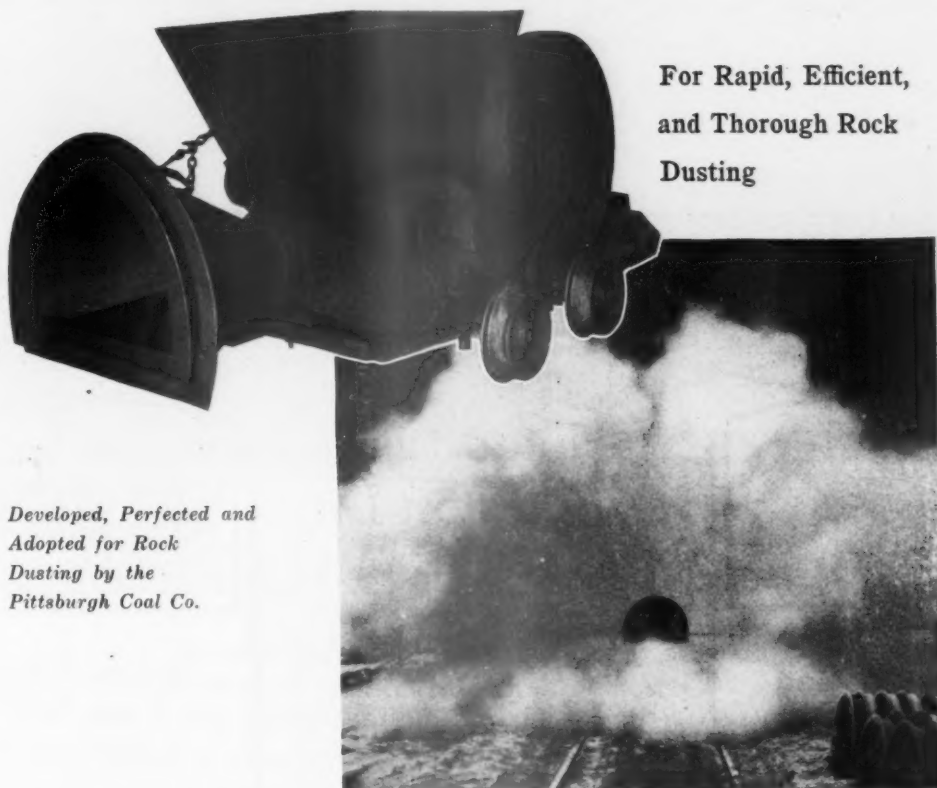
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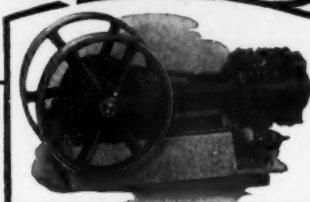
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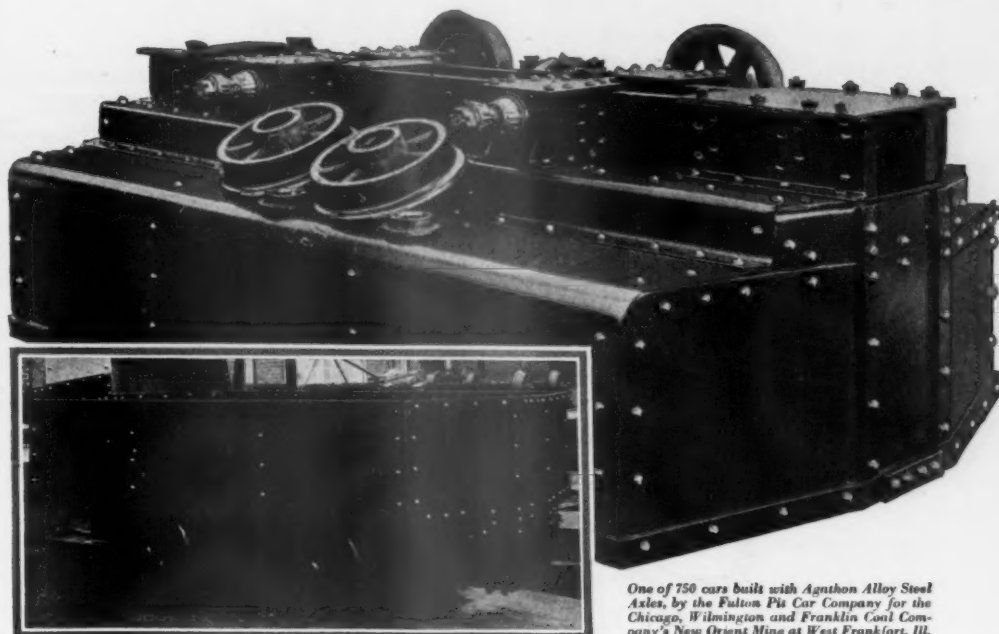
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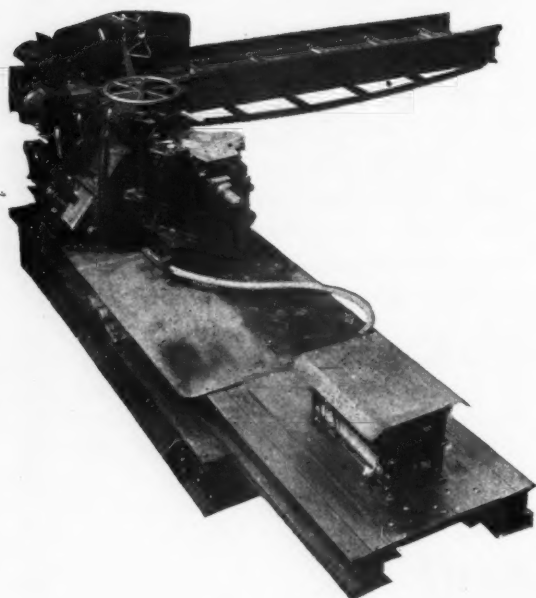
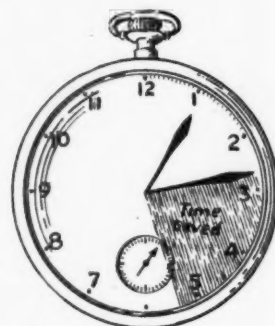
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Any of these devices may be arranged to handle any types of cars:

High and Medium Cars.
Low or Box Type Cars.

By Engagement of:

Axles—At center by single spur, or close to bearings by double or forked spur.

Lugs—Attached to car bodies.

Special—Improved methods developed by ourselves.

All in such variety of designs as to provide control of cars moving either by gravity or by power, under all conditions:

With Rotary Car-Dumpers, Cross-over Dumps or Kick-back Dumps

With Rope Hauls on Slopes or Heavy Grades

With Hoisting Cages. With Track Scales

On Double-Gauge Tracks

At Knuckles or at Heads of Inclines

For Coupled Trips or for Cars Running Alone

Supplied either as Machinery Only or as Complete Assemblies—self-contained units, with supports and track sections, to be installed between shifts

Write for our new bulletin covering this line of equipment

(71)

ROTARY CAR-DUMPERS FOR MINE CARS
(GRAVITY, ELECTRICAL OR PNEUMATIC DRIVE)

GRAND CROSSING
CHICAGO
ILL.

CAR-DUMPER & EQUIPMENT CO.

THE MECHANICAL SPRAGGER
AUTOMATIC TRIP CONTROL EQUIPMENT

"SOLIDCAR" SELF-DUMPING CAGES
CAR CONTROL AND CAGING EQUIPMENT

WESTINGHOUSE BLDG.
PITTSBURGH
PA.

ROTARY CAR-DUMPERS FOR
STANDARD GAUGE RAILROAD CARS

The CEMENT-GUN in Fighting Fire

Note Its Use in the Mine of the Pine Hill Coal Co.,

Pine Hill Coal Company

Pine Hill Colliery - Oak Hill Colliery

C. H. Strange
Gen. Mgr.

Minersville, Pa., March 19th, 1924.

Mr. B. C. Collier, Pres.,
Cement-Gun Co., Inc.,
Allentown, Penna.

Dear Sir:

I want to thank you for the interest you took and the trouble you went to in order to accommodate us in getting needed material and service on our Cement-gun.

On February 28th fire was discovered in our 4th level, or 200 foot elevation, and it was necessary to seal off the vein in which the fire was found, as the fire section was in old workings, and inaccessible. This vein is pitching about 40°. At the first level, or 300 foot elevation, a pillar had been left under a water-course; this pillar had run through in two places, and the space filled with broken rock. Every place was satisfactorily sealed except this section, which, due to the broken character, was very difficult to seal; we are overcoming this by building a timbered passageway past this section - planked, wire meshed and then sealing with Gunite; this passageway to carry a ten inch pipe and an open trough.

The job looked so discouraging at first that all of our men, including Hubler, did not have the heart to try it. I prevailed upon Hubler and he then stated that he would do it if anybody could, which put the heart into our men and the job went ahead, and is still going satisfactorily.

I might mention that at first it was necessary for the operators to wear gas masks as a protection against carbon monoxide, until some temporary seals were made and then two men, equipped with oxygen helmets, watched the workers.

The job is going ahead under rather trying circumstances, and was only made possible by the newly invented carbon monoxide gas mask, and the cement-gun.

Very truly yours,

PINE HILL COAL COMPANY,

C. H. Strange Gen. Mgr.

CHS/DNT

as described in *Coal Age*, Oct. 1, 1925

Read the accompanying letter from Mr. Charles H. Strange, Gen. Mgr.:

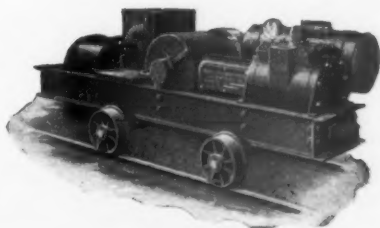
"The job is going ahead under rather trying circumstances, and was only made possible by the newly invented carbon monoxide gas mask and the 'CEMENT-GUN'"

Just another reason why the "Cement-Gun" should be standard equipment in every mine.

Use it for preventing slacking and eliminate the necessity of timber; for building air-tight stoppings, brattices, overcasts, etc.; for fireproofing and protecting timber; for protecting steel; for waterproofing, and for building construction and repair work of all kinds.

And then it will be on hand for emergencies such as the Pine Hill Co. experienced.

Also available for distributing "Rock Dust"—efficient and economical—Pressure and feed under positive control at all times.



No "Cement-Gun" is Properly Complete
Without a TRAYLOR Compressor

The ideal compressor for all mine work. Large capacity—high efficiency—and smallest overall dimensions of any mine type compressor on the market.

To Agents—We Have Territory Open

Let us show you why the "Cement-Gun" should be standard equipment in your mine.

Cement-Gun Company

Incorporated

Allentown, Pa.

New York
Seattle

Pittsburgh
San Francisco

Phoenix
Salt Lake City

Chicago

Agents in Eastern Canada:

General Supply Co. of Canada, 356 Sparks St., Ottawa

Foreign Agency:

International Cement-Gun Co., Zeist, Holland

THE CEMENT-GUN IS NOT

A RESTRICTED ARTICLE AND MAY BE
PURCHASED AND USED BY ANYONE

In addition, however, to aid you, we also have a Contract Department prepared to give you a bid on any Gunite work you may have.

TURBINAIR

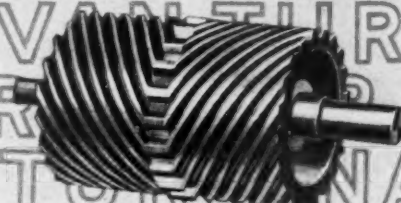
SULLIVAN TURBINAIR HOISTS are still a little mysterious to some people. All you see is the drum and clutch and brake. But open the throttle, and she sure does PULL.

It's All in the Drum

The Sullivan Turbinair motor is all neatly encased inside the drum, away from dirt, and requiring no attention. It runs in oil, on ball and roller bearings, and increases its efficiency with use.

Just a pair of balanced helical gears, running together. No cylinders, no pistons, no connecting rods, no valves.

TURBINAIR HOISTS will do a lot of work safely on air pressures as low as 30 lbs. At 50 lbs., they will lift 1200 lbs. at 110 ft. a minute, or a ton on 75 lbs. pressure.



USE TURBINAIR HOISTS for any lifting or pulling job in mining, quarrying, or construction work. Double Drum Hoists are popular for all scraper loading. Try one to run your drag line.

TURBINAIR HOISTS are rated at 6½ H.P. Single drum model weighs 345 lbs., double drum 680 lbs. Drum handles 350 ft. of ¾-inch wire rope; (double drum, 160 ft. on each drum.)

Sullivan Electric Single and Double Drum Hoists are also widely used. They are uniform with the Turbinair models in power, capacity, handling and convenience.

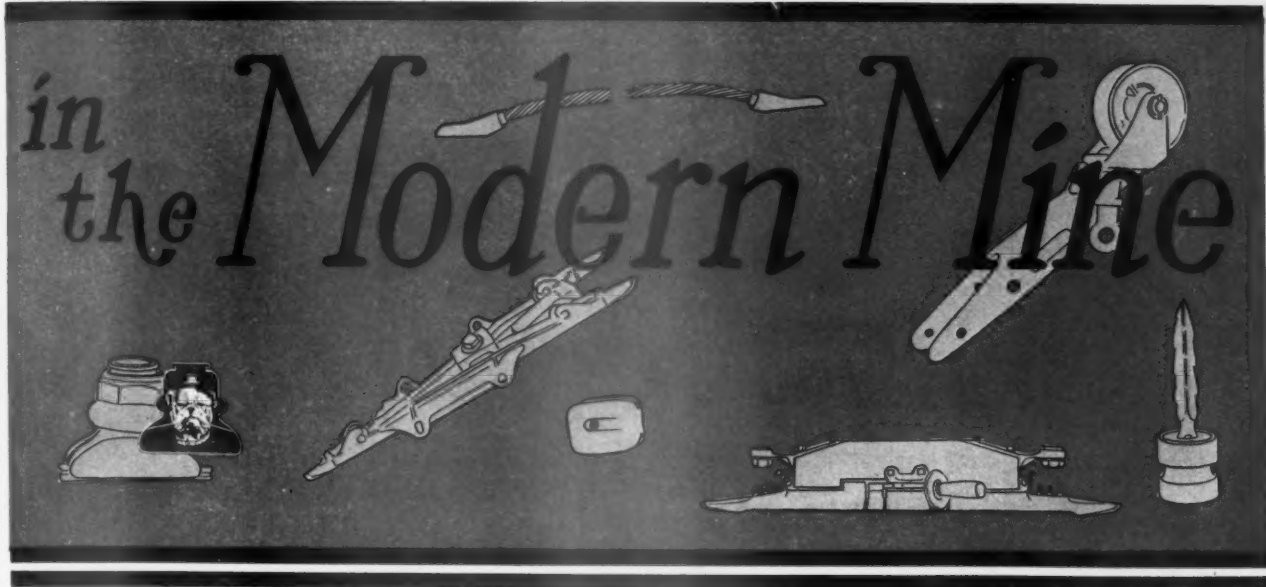
Ask for Bulletin 76-F

SULLIVAN MACHINERY COMPANY

148 SOUTH MICHIGAN AVE.,



CHICAGO, ILLINOIS, U. S. A.



TODAY, modern equipment and methods are bringing new records of production.

Mining operators and engineers have not been laggard in adapting or proposing the improved mining materials that make this progress possible.

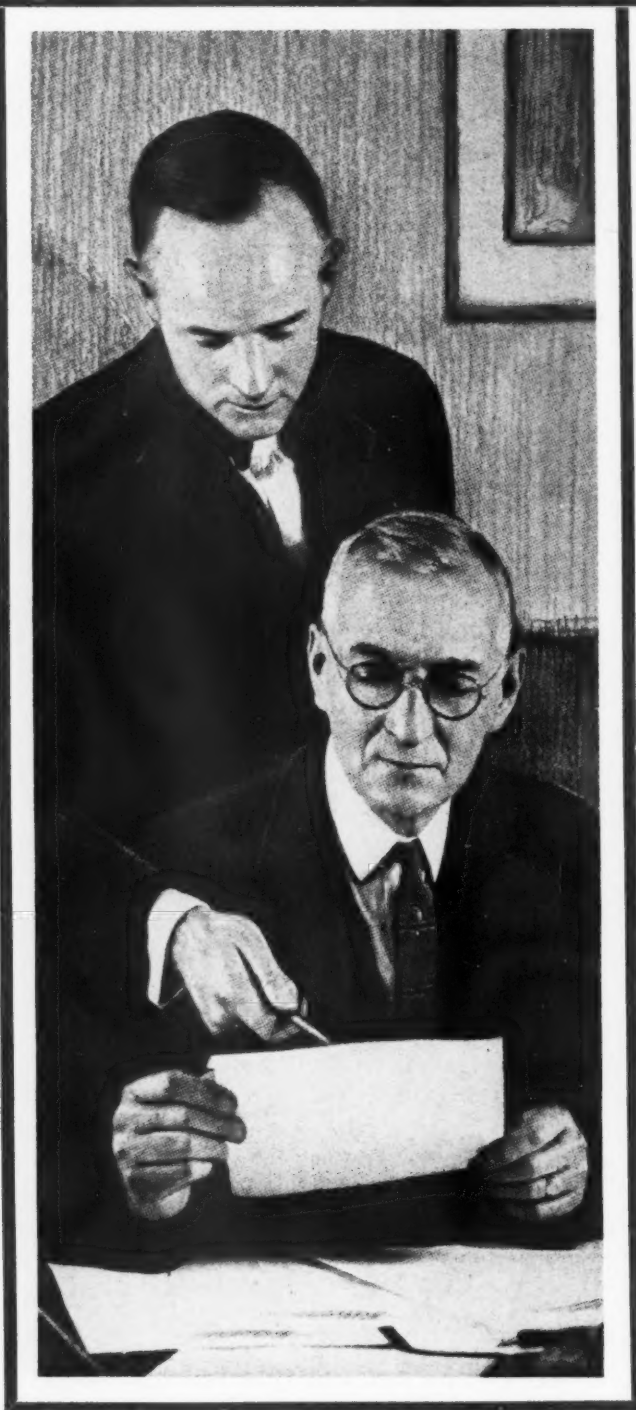
Greater efficiency and capacity in electric haulage have been and will be one of the most important factors.

O-B Electric Haulage Materials, by their prominence in the modern mines throughout the country, testify to the O-B part in this greater production.

The Ohio Brass Company Mansfield, Ohio

In Canada—Dominion Insulator & Mfg. Co., Limited—Niagara Falls, Ont.

BONDS ——— HEADLIGHTS



Efficient Track Systems Depend Upon—

Methods of mining.

Present and future production from each section of the mine.

Kind and capacity of haulage equipment.

Axle loading.

Wheel base and wheel design of locomotives and cars.

Speed of trains.

Roadbed conditions.

Gradients and clearances.

Properly Planned Track Systems Mean—

A more uniform operation.

Better car distribution.

Fewer delays.

A minimum of traffic congestion.

Less equipment required to handle the same amount of material.

Pointing the way to the economies in a well planned track system

Many elements must combine to render mine track work efficient. Ability to stand heavy punishment is not all that is required. Trackage must be designed to meet specific mining conditions—natural conditions—mining methods—kinds of mining equipment used—all enter into the factor of efficiency.

To carry the tonnage with a minimum of repairs and tie-ups under the heavy knocks that it meets is not question of materials alone. There must be efficient track engineering in fitting even the best of materials to your need. And this is the service we are prepared to render you. A group of practical mine engineers and track equipment builders ready to help you—engineers who have helped many mines speed up production and cut costs of getting coal from the face to the tippie. And they have done this at considerably less cost than many operators had thought possible. Put your trackage and haulage problems up to them. It costs no more in the first place and less in the long run.

We will work out specifications for your track system that will meet your conditions, that will allow interchangeability of parts and that will guide you in future additions, alterations and replacements.

Track equipment materials that mean—

SAFETY FIRST THAT LASTS.

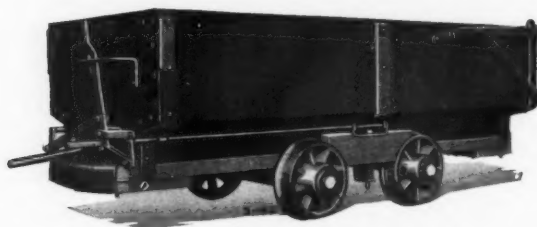
CENTRAL

MINE TRACK EQUIPMENT

Our line of equipment includes frogs, switches, switch stands, turn-outs, crossings, and all other track equipment and accessory items used in mines. We carry a large supply of standard parts and accessories. Your hurry-up orders will get hurry-up service.

THE CENTRAL FROG AND SWITCH CO.

Cincinnati, Ohio



When you buy Watt Cars

You buy cars built of the best materials—expert workmanship and backed by all these years of experience in car building.

For sixty-two years Watt Cars have served hundreds of mines throughout America's coal regions.

From every point of view we are ideally equipped to supply every want in car construction and value.

Today, as never before, the demand is uppermost for cars that better your haulage system and cut down the cost per ton of coal.

Write at once for the Watt catalog, or, if you wish a personal interview, wire your most convenient time and meeting place and our representative will be there.

The Watt Mining Car Wheel Co.

BARNESVILLE, OHIO

Selling "Watt Quality Products"

PITTSBURGH, PA.—W. C. Wilson, 1135 Greenfield Ave.
NEW YORK, N. Y.—C. R. Gier Co., 66 Beaver St.
SAN FRANCISCO, CALIF.—N. D. Phelps, Sheldon Bldg.
HUNTINGTON, W. VA.—J. E. Graham, 341 Sixth Ave.
CHICAGO, ILL.—W. W. Baker, 140 South Dearborn St.
DENVER, COLO.—Lindrooth, Shubart & Co., Boston Bldg.
BIRMINGHAM, ALA.—Industrial Supply Co.

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Maximum Demand Charges

Can now be reduced and held to a minimum Without Decrease of Production



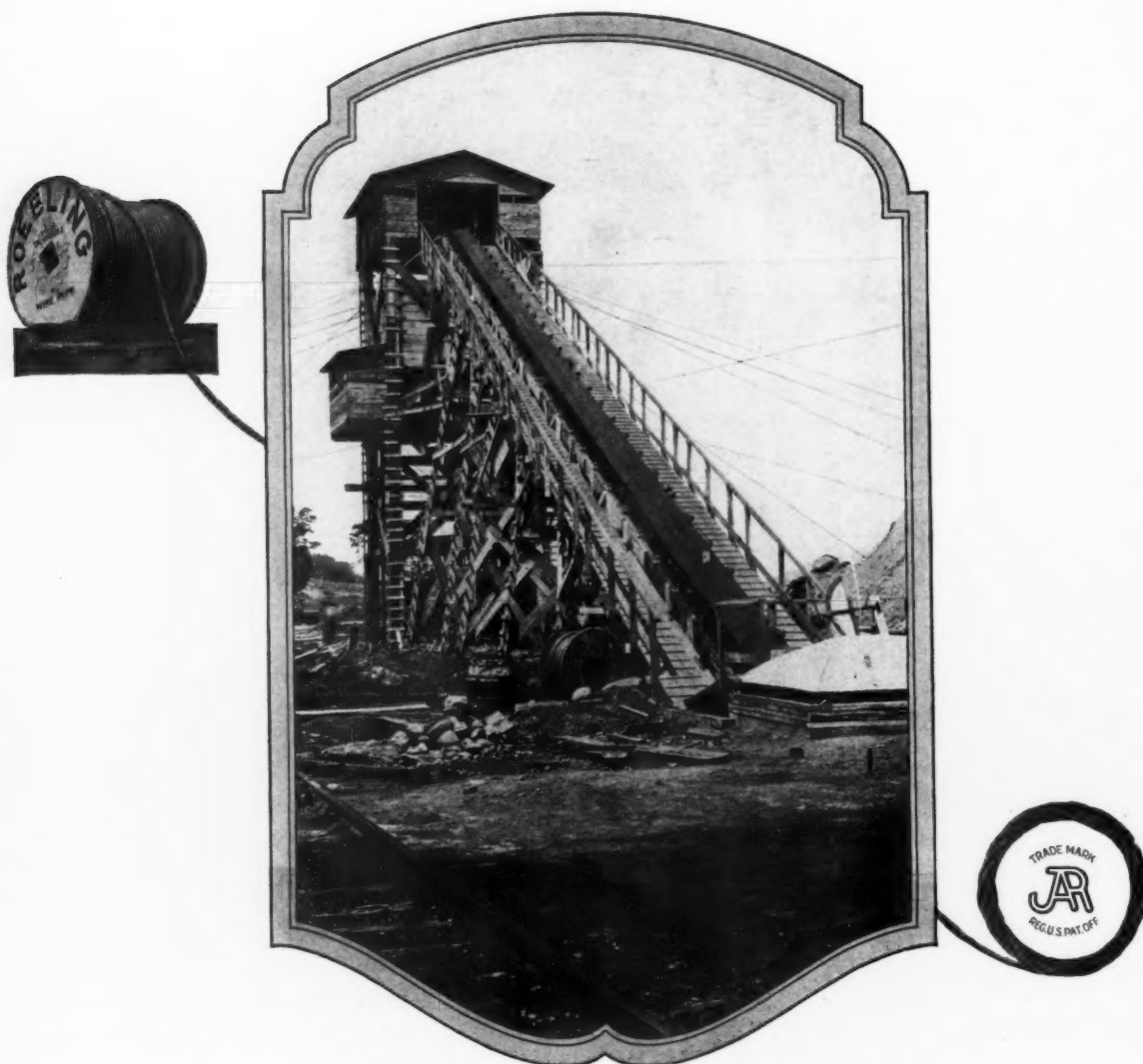
Locomotive Equipped with Overload Line Contactor and Type "Q" Controller Handle

Automatic Overload Line Contactors and Type "Q" Handles on your locomotive absolutely hold the starting current to less than one-half the amount usually used on the mine locomotive.

Write for Bulletin No. 504—this tells the whole story.



The Automatic Reclosing Circuit Breaker Co.
Columbus, Ohio



Blue Center Steel Wire Rope

*M*ost wire ropes look the same, but what a difference in results!

In mining, exceptional conditions exist which must be met by the use of wire rope possessing exceptional qualities.

Roebling Blue Center Steel Wire Rope possesses these qualities. It is made of a superior grade of steel produced in our own furnaces and is fabricated by skilled workmen, under expert supervision.

John A. Roebling's Sons Company
Trenton, New Jersey

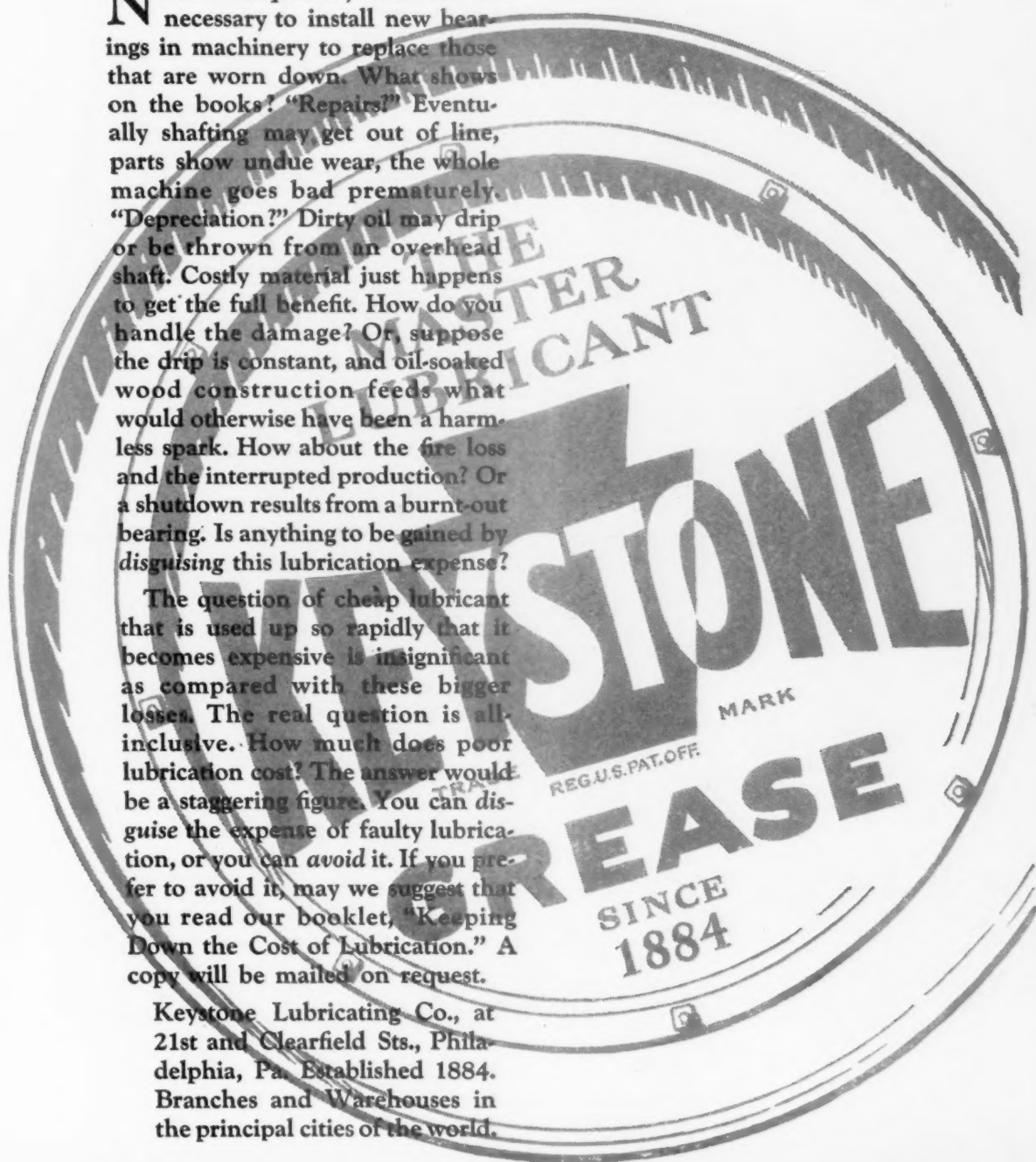
RoeblinG

You Can Disguise the Expense of Faulty Lubrication or You Can Avoid It

NOT infrequently it becomes necessary to install new bearings in machinery to replace those that are worn down. What shows on the books? "Repairs!" Eventually shafting may get out of line, parts show undue wear, the whole machine goes bad prematurely. "Depreciation?" Dirty oil may drip or be thrown from an overhead shaft. Costly material just happens to get the full benefit. How do you handle the damage? Or, suppose the drip is constant, and oil-soaked wood construction feeds what would otherwise have been a harmless spark. How about the fire loss and the interrupted production? Or a shutdown results from a burnt-out bearing. Is anything to be gained by disguising this lubrication expense?

The question of cheap lubricant that is used up so rapidly that it becomes expensive is insignificant as compared with these bigger losses. The real question is all-inclusive. How much does poor lubrication cost? The answer would be a staggering figure. You can disguise the expense of faulty lubrication, or you can avoid it. If you prefer to avoid it, may we suggest that you read our booklet, "Keeping Down the Cost of Lubrication." A copy will be mailed on request.

Keystone Lubricating Co., at
21st and Clearfield Sts., Phila-
delphia, Pa. Established 1884.
Branches and Warehouses in
the principal cities of the world.





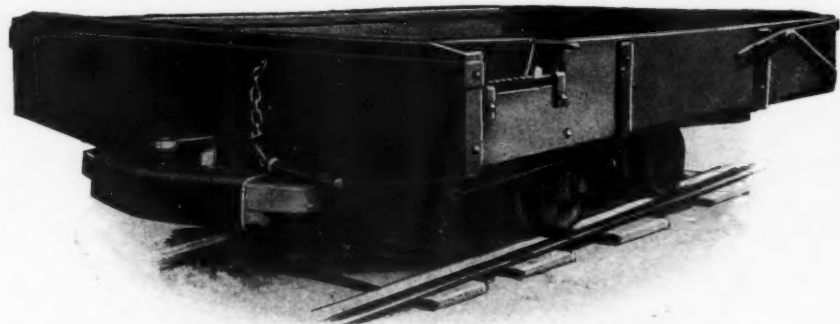
***"Everybody talks about the weather—
but nobody does anything about it!"***

Perhaps at one time, Mark Twain's complaint might have been with equal truth applied to the coal industry; but no longer. Out of the welter of investigation and conference are emerging sound, conservative, thoughtful plans, destined to restore King Coal to his rightful place.

One thing all are agreed on—profitable operation must come through lower production costs. Many operators have found Hockensmith cars the first step in this direction. These cars are designed to meet the requirements of each specific installation; they are ideal for use with mechanical loaders, and in low seams; they permit increased hand-loaded tonnage; they often—due to the maximum capacity, minimum height feature—eliminate costly roof and bottom work; they give long, dependable service with little attention.

All their advantages cannot be covered here. But a word from you will bring our representative, who will tell you more of how Hockensmith Cars will fit into your plans—and help to carry them out.

*A maximum capacity—
minimum height car de-
signed in line with the
newest practice. Efficient
and economical for use in
thin seams, and with
mechanical loaders.*



HOCKENSMITH WHEEL & MINE CAR CO.

PENN, PENNSYLVANIA
(Pittsburgh District)

Long Distance Phone—Bell Jeannette 700

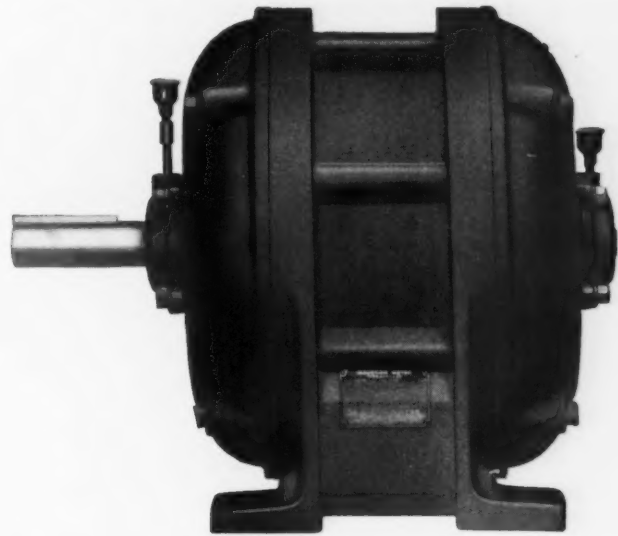
Sales Representatives:

Huntington, W. Va.....Huntington Supply & Equipment Co.

Chicago, Ill.....

B. E. Shonthal & Co.

Clarksburg, W. Va.....Mr. Norman Strugnell



Re-Figure Your Motors

The motor on Timken Bearings has wear-proof shaft support. The rotor ROLLS on Timken steel. The Timkens carry radial and shock load.

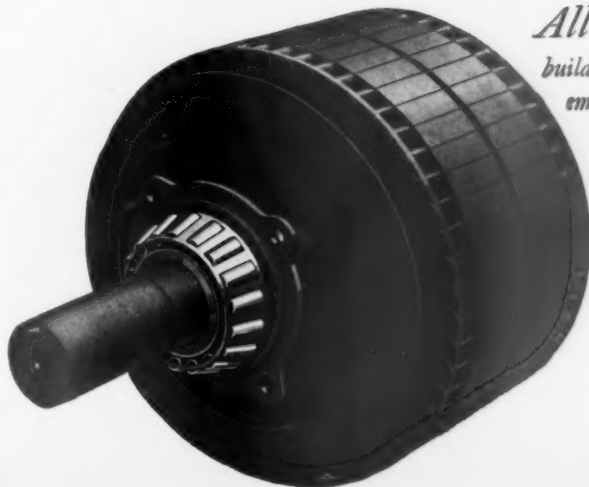
The increased rigidity, perfect alignment and freedom from wear keep the air-gap permanently accurate. Yet lubrication and inspection at rare intervals is ample! The starting period

is shortened. Running load is lighter. Motor position is not a delicate problem.

In all these ways Timken Tapered Roller Bearings sharply cut the maintenance and operating costs on Timken-equipped Allis-Chalmers electric motors, while far extending motor life.

THE TIMKEN ROLLER BEARING CO.
C A N T O N , O H I O

TIMKEN *Tapered Roller* BEARINGS



Allis-Chalmers
builds Electric Motors
embodying Timken
advantages

COAL HANDLING EQUIPMENT

Loading Booms

**Automatic Self Dumping
Steel Cages**

Sheave Wheels

Conveyors

Steam and Electric Hoists

Automatic Empty Car Lift

Shaker Screens

Hoppers

Our adjustable helical end loader allows an easy action in loading. It can be adjusted to suit any height car so the coal can be laid into the car instead of having to drop in, insuring minimum breakage. It is always at right angles with the car and is especially valuable in topping. Can be operated by either hand or electric winch. It takes the place of a loading boom at about one-fifth the cost. Works with either bar or shaker screen and is made right or left hand.

Holmes Super Sheave Wheels are either plain turned or made with removable steel-grooved liners. Removable liners are of hardened steel bolted through rim of wheel, and are interchangeable and renewable at any time without having to remove the rope from the wheel.

Let us tell you about the operation of any of our coal handling equipment that interests you.

Consult with us about any Coal Handling Problem

Robt. Holmes & Bros.

INCORPORATED

Danville, Illinois

The great leader of a great industry

EVERY industry has its leader. Du Pont was the pioneer in explosives manufacture in this country, and has held that leadership for 123 years.

It has been the privilege of the du Pont organization to inaugurate every great forward step in the development of explosives through continuous research and experiment. Du Pont not only has produced explosives of every type to meet the varied requirements of industry, but has anticipated those needs by developing explosives to meet new conditions and new problems.

In ore mining operations use du Pont explosives

There is a du Pont explosive to meet every blasting need—to do your particular work *best at least expense*. For ore mining we especially recommend:

Du Pont Gelatin Dynamite because it is plastic, absolutely waterproof, practically non-freezing, and produces the smallest volume of obnoxious fumes. It is unequalled for underground shooting of hard rock.

Red Cross Ammonia Dynamite is ideal for its all-round blasting qualities, and is the most popular high explosive sold. While it is classed as low-freezing, it is actually non-freezing under any atmospheric conditions.

Du Pont Blasting Accessories give you maximum efficiency from your explosives. Make every shot *sure*—protect your blasting investment by using only du Pont accessories.

For further information about du Pont explosives and blasting accessories, please refer to Mining Catalog—Metal-Quarry Edition—or write to our nearest office.

E. I. DU PONT DE NEMOURS & CO., Inc.

Explosives Department

WILMINGTON, DELAWARE



Du Pont chemical engineers insure uniformity of quality by chemical control through every step of manufacture from raw material to finished product.

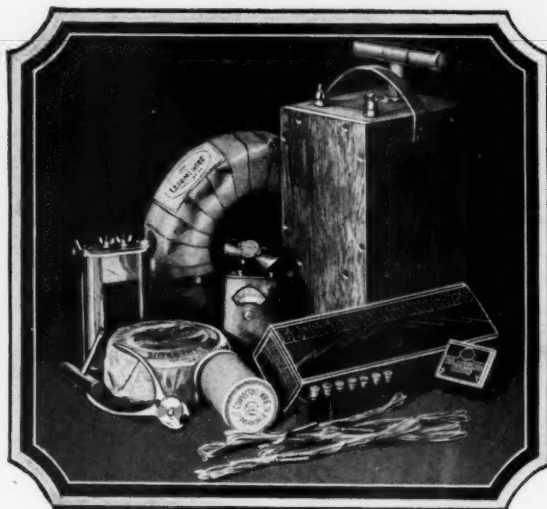
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Du Pont Products
Exhibit,
Atlantic City, N. J.

POWDER MAKERS SINCE 1802

ATLAS Products will cut your blasting costs



No matter what the nature of the work, there is a grade of Atlas Explosives that will meet every blasting requirement encountered in mining. Moreover, the use of the right grade not only assures better work, but it cuts the cost of mining.

Atlas Extra Dynamite Low Freezing is particularly suited for metal mine blasting. In strength it is equal to the corresponding grade of nitroglycerin dynamite, yet the speed of detonation is slower.

Atlas Coalites—Atlas Permissibles—are made in ten different grades—a grade particularly suited to the requirements of every prominent coal field.

In addition to explosives for every blasting requirement, ATLAS manufacturers Blasting Supplies for every purpose—blasting caps, electric blasting caps, blasting machines, etc.—every kind of blasting supply needed for mining work.

Only the finest materials obtainable are permitted in the manufacture of Atlas Explosives and Blasting Supplies. Every operation performed is always watched closely—Atlas inspection system is extremely rigid. Thus, the high quality of Atlas products is safeguarded and your satisfaction assured.

The Atlas Service Man is prepared to tell you what grade of Atlas Explosives as well as what forms of Atlas Blasting Supplies are best adapted to your work. It will mean a saving in your blasting costs. Write nearest branch.

ATLAS POWDER COMPANY Wilmington, Delaware

BRANCH OFFICES:

Allentown, Pa.; Birmingham, Ala.;
Boston, Mass.; Charleston, W. Va.;
Chicago, Ill.; Des Moines, Iowa;
Houghton, Mich.; Joplin, Mo.;
Kansas City, Mo.; Knoxville, Tenn.



BRANCH OFFICES:

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Pa.; Philadelphia, Pa.; Pittsburg,
Kans.; Pittsburgh, Pa.; Pottsville,
Pa.; St. Louis, Mo.; Wilkes-Barre,
Pa.

MYERS-WHALEY SHOVELING MACHINES

*"The All-around Loaders
for Underground Work"*



*MYERS-WHALEY COMPANY, Knoxville, Tenn.
Manufacturers of Underground Loading Machines For Over 16 Years ~*

THE MANUFACTURERS' DIVISION

Presents each year

An Exposition of Coal Mining Equipment

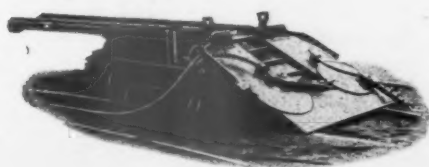


A View of Some of the Exhibits at a Former Exposition

These expositions staged in connection with a convention for the discussion of coal mining problems have been held for the last two years in Cincinnati

FIRST, THE IDEA—
With Design and Development—
**FOLLOWED THROUGH TRIAL AND CHANGE
TO THE FIRST COMMERCIAL MACHINE**

Then—



1922
TYPE 4 BU.
Now Being Used by the
Union Pacific Coal Co.

And—



1924
TYPE 5 BU.
140 Machines Installed

Now—



1926

THE IMPROVED TYPE 5 BU.

By continual field experience and continued mechanical improvement Joy Loaders have increased tonnage outputs and decreased costs.

JOY MACHINE COMPANY

FRANKLIN, PA., U. S. A.

Safeguard the Mine with Standard Equipment

The New EDISON



Electric
Safety
Cap Lamp

Since the first announcement of the New Edison in November, 1923, over 60,000 lamps have been installed—an outstanding proof of Safety, Efficiency, and Dependability.

The New Edison provides a clean, powerful light of 6 candlepower, which is three times as much light as Model "C" and 50% more illumination than any other approved cap lamp.

Burns 12 hours continually or intermittently without any attention whatever.

Constructed of steel throughout, with a steel-preserving alkaline solution, the Edison battery possesses rugged strength and long life.

M. S. A. ROCK DUST DISTRIBUTOR

Efficient and
Economical



Already installed and successfully operating in many of the largest coal mines in nearly all coal fields.

The swinging, manually operated nozzle permits the placing of the dust exactly where it is most needed, and without waste of dust.

Only two men are required to efficiently operate the Distributor and Locomotive.

All controls of dust feeding mechanism and motor control are situated where the operator can manipulate them without leaving his seat.

Write us today for descriptive literature

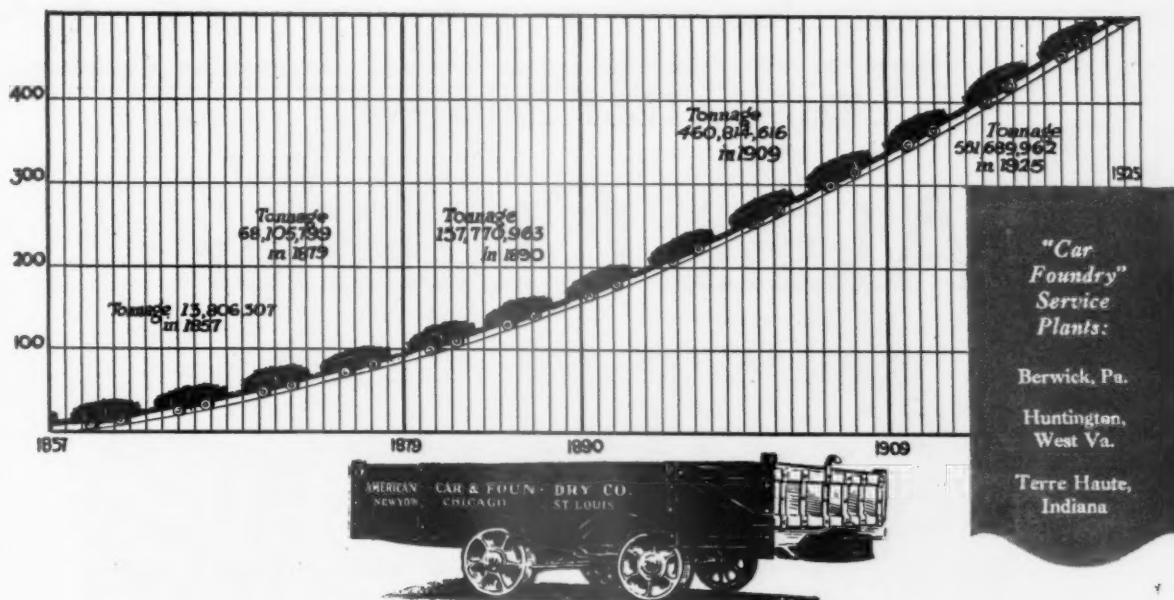
Mine Safety



Appliances Co.

Braddock Ave & Thomas Blvd. Pittsburgh, Pa.

"Everything for Mine and Industrial Safety"



Keeping pace with the industry's needs!

WHEN the yearly tonnage of most mines could be measured in thousands instead of hundreds of thousands, when electric "locos," mechanical loaders, and rotary dumps were unheard of, "Car Foundry" Mine Cars had already earned a reputation for good service.

As tonnages grew, and greater capacity, easier running, more durable, wider, and lower cars were needed, "Car Foundry" Mine Cars met all the newer-day demands. After building Mine Cars for 68 years, we know—
—that if you want standard types of cars—or our

advice as to special features—we can meet your requirements from among an almost countless number of cars which we have built for others—or we can develop a new design for any special purpose—or if you wish we will build to your specifications—exactly;

—that cars built to stand heavy service—even abuse—will always be most profitable to users—cost less to maintain—last longer. **THAT IS THE WAY WE BUILD ALL "CAR FOUNDRY" MINE CARS.**

Always Get a "Car Foundry" Quotation

American Car and Foundry Company

New York

St. Louis

Chicago

CHILLED IRON WHEELS
MINE CARS

BARS, IRON AND STEEL
CAR IRONS

BOLTS, NUTS, RIVETS

68 years
Service

IRON BODY GATE VALVES
CAR TRUCKS

ELECTRIC RIVET HEATERS
PINS AND LINKS
FORGINGS

"CAR FOUNDRY"

THE LATEST IMPROVED

Akins Classifier

IS ATTRACTING WIDE ATTENTION

Its principle of operation, developed through sound engineering, results in the following:

MECHANICAL ADVANTAGES

- Sizes from 16" to 96" diameter of spiral.
- Extremely sturdy construction.
- Large diameter hollow shaft, eliminating truss rods.
- One piece rigid arm construction.
- Improved drive permitting smaller pulley and higher belt speeds.
- Slow continuous motion in one direction.
- Long life of the few wearing parts, which are cheaply and easily replaced.
- The larger sizes can be had with a lifting device for the lower end of the spiral, which permits easy starting after shut-downs without the necessity of draining the tank.
- A completely self-contained steel construction if desired.
- Power requirement low by actual test.
- Overall dimensions and practicable steep inclination which are very favorable to coupling in closed circuit grinding.
- Capability of uninterrupted operation over long periods.

OPERATING ADVANTAGES

- Capability of handling from the smallest tonnages to the maximum capacity of the largest existing grinding units under their greatest circulating loads.
- Ability to make close, uniform separations and deliver a remarkably dry and clean sand.
- Large overflow capacity due to absence of agitation in the settling pool and of surges over the weir.
- The continuous movement of the spiral gives tremendous sand delivery at a moderate speed.
- The spiral will not ride on top of the sand when the machine is overloaded or working on material of high specific gravity.
- Pool area and depth adjustable to meet settling rate of ores.
- Continuous, dependable operation over long periods insuring freedom from shut-downs.
- Remarkably few parts requiring lubrication and these are easily accessible.

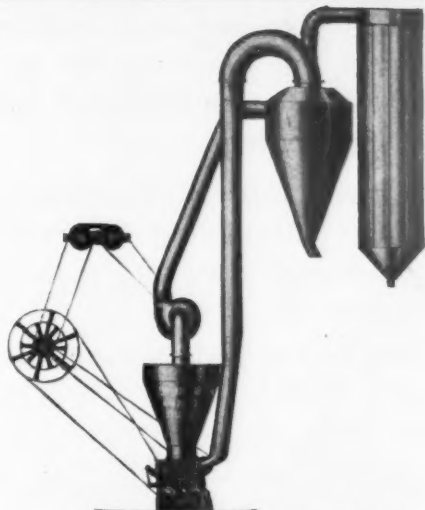
Of equal merit in their special fields, are the Impact Screen, Lowden Dryer, Akins Flotation Machine, Skinner Roaster, Colorado Rod and Ball Mills, Colorado Diaphragm Pump, Pettibone Mulliken Co.'s Manganese Steel Castings

Colorado Iron Works Company

Denver, Colorado

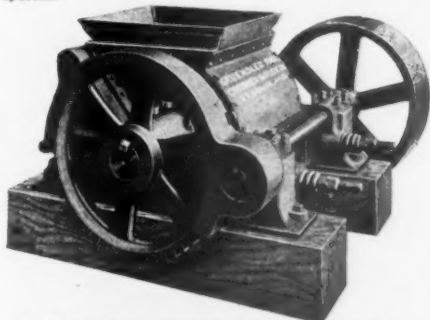
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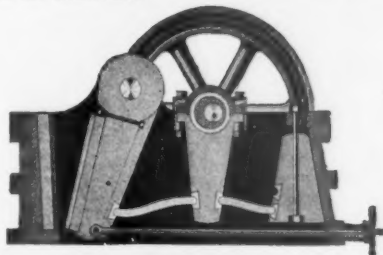
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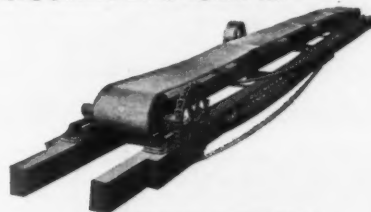
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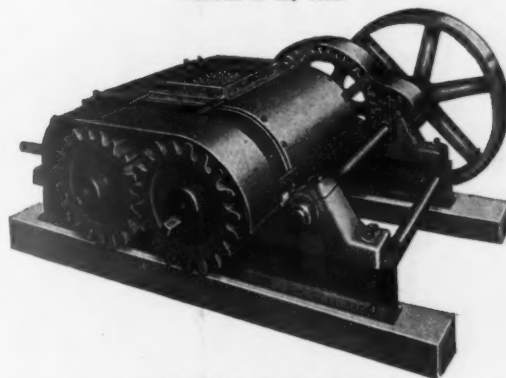
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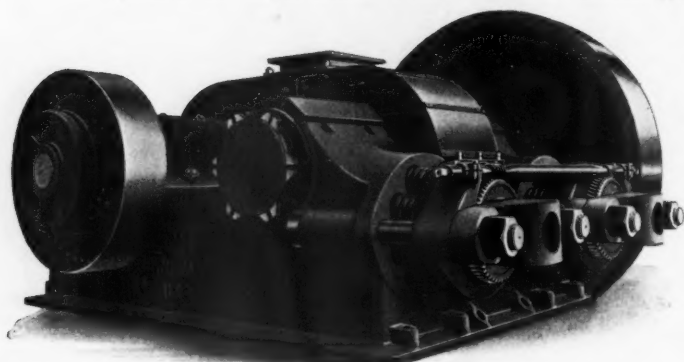
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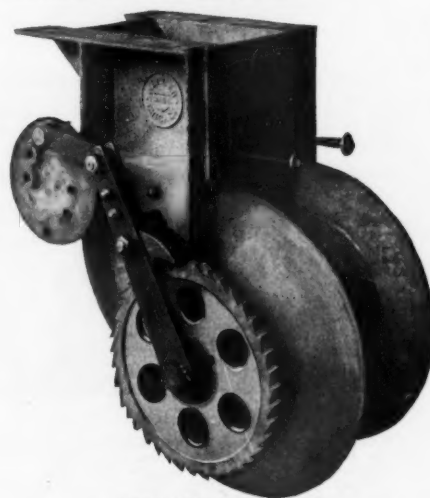


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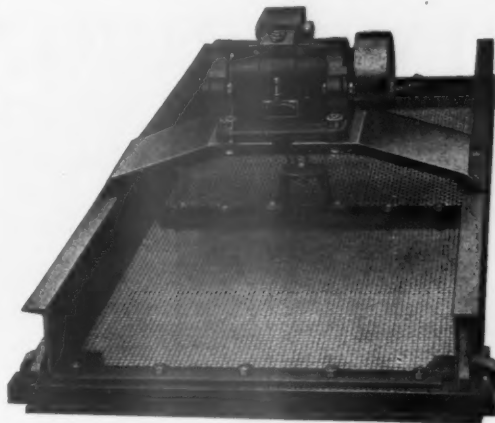
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Mining as a Thermal Process

The great deposit of sulphur in the salt dome at Gulf, Matagorda County, Texas, does not lend itself to exploitation by ordinary mining methods. The overlying strata are unfavorable to shaft sinking. The support of underground workings would be difficult because of the "heavy" back, and the question of extracting the sulphur from the ore would be one involving great mechanical and metallurgical problems.

By taking advantage of the physical properties of the sulphur, its low melting point, specific gravity, and immiscibility with water, together with the fact that the calcite in which it occurs is unaffected by ordinary working temperatures, these difficulties are swept aside. A shaft is used—but it consists of a 6-inch or an 8-inch pipe. The underground workings can be pictured only in the imagination, for no one has ever seen them! The matter of support is of no importance, and no effort is made to keep the workings open. The mechanical separation of the sulphur from its ore occurs one thousand feet below the surface of the ground, solving in a highly efficient manner a problem which ordinarily could only be solved by a costly and otherwise unsatisfactory process.

And the agents are primarily heat and gravity!

A power plant with a rating of over 12,000 horsepower supplies the heat necessary to melt the sulphur underground. Superheated water is the medium through which the heat units are carried into the deposit. The action of gravity separates the molten sulphur from the water, and the immiscibility of the two substances makes for perfect separation. Hydrostatic pressure and an air-lift raise the liquid sulphur to the surface.

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COAL

WEST VIRGINIA and its

In an address before the 1922 Annual Meeting of the Kanawha Coal Operators Association, in Charleston, W. Va., Mr. E. J. McVann stated:

"Here we have a State that ranks second in the Union in the production of coal. If its great coal areas cannot be worked, industry suffers in practically every state east of the Mississippi River. Indeed, on April 1st, when the United Mine Workers' organization struck and shut down more than 60 percent of all the mines in the United States, the mines of West Virginia stood between the country and complete paralysis of its industries."

West Virginia has more extensive coal deposits of high quality coal than any other of the forty-eight states. The state has a coal area of more than 17,000 square miles, in the heart of the Appalachian coal field, and the smokeless coals produced in the state are rated as the highest quality steaming coals in the world. Geologists estimate that there are 1,600,000,000 tons of coal stored in the hills and mountains of West Virginia.

Concerning these great reserves a prominent journalist thoroughly familiar with southern resources, made the statement a few years ago, that if the coal above water level lying in the State of West Virginia was capitalized at 10 cents per ton it would pay the entire national debts of the world or buy every mile of railroad in the United States at its then present value.

In 1924 the production of coal in West Virginia reached the high record of 110,000,000 tons.

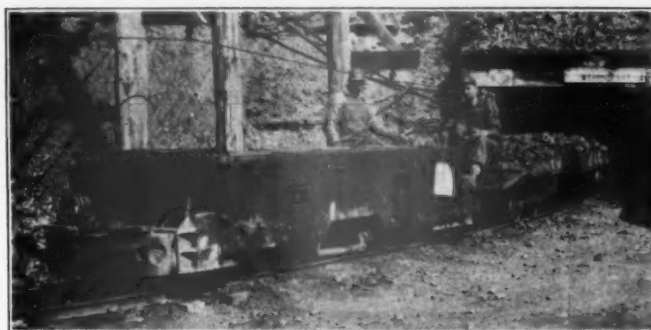
The beginning of the oil and gas industry in West Virginia was established during the years 1805 to 1808, when pioneers drilling for salt brines encountered natural gas in the Kanawha Valley. However, natural gas was not discovered in any great quantity until 1841 in this same valley, and it was used as a fuel in the evaporation of salt brines. In 1860 the first oil well was drilled in West Virginia

WEST VIRGINIA—

COAL

NATURAL RESOURCES

and intermittent drilling was continued until the early nineties and in 1900 reached its peak, with an annual production of 16,195,000 barrels. The total pro-



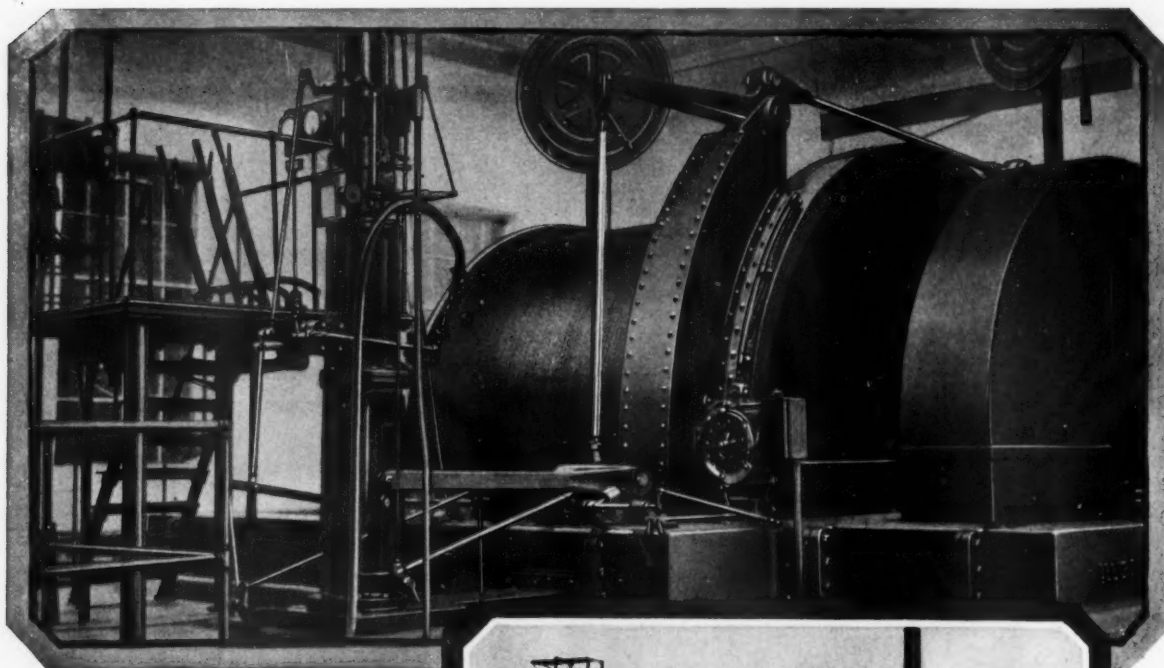
At the Elkhorn Piney Coal Mining Company, Huntington, W. Va.

duction since West Virginia became interested in the production of oil is over 325,000,000 barrels.

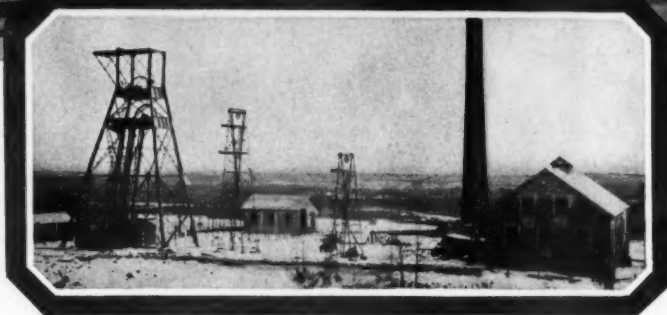
Natural gas production reached its peak in 1917, when 309,000,000,000 cubic feet of gas was extracted from the earth. Geologists estimate the production of oil and gas will continue until the latter part of the present century.

According to the figures of the U. S. Geological Survey, the Southern States produced in 1920 9,640,000,000 kilowatt hours of electric power. West Virginia led this division in electrical production for that year. The total kilowatt-hour output in West Virginia was 1,351,000,000. It is estimated that the streams of West Virginia are capable of producing 1,250,000 horsepower. The development of hydro-electric energy in West Virginia is now in its infant stages, but work has already begun in the New and Cheat Rivers, the two streams capable of producing the largest quantity of electrical energy.

A Great Coal Producing State



Allis-Chalmers Hoist installed in electrifying the famous Soudan mine



The electrification of the famous old Soudan iron mine, the pioneer of the development of the Vermillion range in Minnesota, includes an electric-driven Allis-Chalmers Hoist.

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This installation is typical of all Allis-Chalmers electric-driven hoists, maximum efficiency and safe operation—the products of an engineering organization noted for ability to build successful mining equipment.

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NUMBER 12

THOSE COMMON PROBLEMS

TWENTY-EIGHT consecutive years of constructive service is an enviable record and one to be proud of, especially when each year has been marked by increased service and material growth both in the organization rendering the service and in the industry served.

On December 9th, the mining industry—literally—will convene for its Twenty-eighth Annual Convention at the New Willard Hotel, Washington. Among those present will be leading coal, metal, and oil men—representing anthracite and bituminous coal industries, the iron, copper, and silver mines, and producers of crude oil; and also producers of clay, sulphur, manganese, tungsten, quicksilver, and representatives of other mining enterprises. They will meet on a common ground to discuss in open forum the problems that affect the mining industry as a whole.

The several branches of the mining industry have many problems in common. Taxation, freight rates, production and marketing, labor, and safety are among those of greatest importance. The industry is constantly called upon to meet discriminatory tax legislation in the mining states, and must constantly fight to preserve recognition of its wasting character in the Federal tax laws. The mining industry furnishes so vast a freight tonnage to the railroads that tampering with the general rate structure is always a matter for serious consideration. Stabilization of the industry—the working out of production and marketing problems, is of vital importance to mining. Mr. Humphries of the Federal Trade Commission will tell the Convention some interesting things about how one great government department looks upon cooperative effort within the industry.

Of major importance to every mining man is the labor problem. In metal mines there is a shortage of labor. Operators are already blaming the Immigration Law for their inability to secure the necessary help. In coal, operators are confronted with a huge surplus of labor with its consequent strikes and disturbances. It is apparent that industrial relations would be materially strengthened if the surplus coal miners might be transferred to the under-manned copper mines. Secretary of Labor Davis is to tell the industry at this Convention his idea of how the labor problem may be simplified; two prominent operators will present this problem from both coal and metal standpoints, and James E. Murdock, former Canadian Labor Minister, will present the Canadian experience with the Industrial Disputes Law.

Cooperation, coordination and simplification have become slogans of Herbert C. Hoover, the mining industry's Exhibit A. The industry is proud of Mr. Hoover. He is going to tell his fellow mining men at this convention how his big ideas as applied to commerce may be applied to the mining industry.

Private initiative and enterprise plus cooperation within the industry have built up the great mineral wealth of this country. The American Mining Congress has been built upon the strong base of the greatest good to the greatest number; on a platform upon which the entire industry may stand and work shoulder to shoulder. One more milestone is to be passed—the twenty-eighth—and as the organization enters its twenty-ninth year, it carries the confidence, the respect and cooperation of all mining men.

The mining industry—from government official to mine superintendent will be represented at the 28th Annual Convention of the American Mining Congress, December 9, 10 and 11. Cooperation is a much over-worked word, but such a demonstration of its actual application is evidence that the mining industry believes it is practical.

A NEW TAX BILL

A NEW revenue bill is scheduled to be the first matter to be taken up by the 69th Congress. This is the sixth general revenue measure that has been before Congress during a period of eight years. The 1916, 1917 and 1918 acts were notable for the increased tax rates and the variety of taxes they carried affecting all classes of taxpayers. They were also notable for their complicated administrative provisions, particularly those relating to the income, war profits, and excess profits taxes. The 1921 act eliminated the excess profits tax, reduced the rates of income tax, except the normal tax on corporations which was increased to 12½ percent and eliminated some of the special taxes. The 1924 act reduced the rates of income tax on individuals and eliminated a few more special taxes. But each act from 1916 to 1924 embodied complicated administrative provisions that, in many respects, became more complex and difficult to interpret with each new law. The revenue act of 1925 will reduce both normal and surtax rates on individuals, but it is very doubtful if the administrative provisions will be improved or simplified. Simplification of the law will be deferred until 1927 according to present plans.

The failure of Congress to take up the revision of the administrative sections of the revenue law with the view to simplification in such a way as to lessen the hardship and enormous expense imposed upon taxpayers in complying with the law is to be regretted. However, the task is one which can not be accomplished in a hasty manner and perhaps the proposal to be made by the Ways and Means Committee that a special commission be created to study this phase and report to Congress in 1927, is the best way to deal with the situation now.

The congestion in the income tax unit at the present time and the inability of the unit to make its work current, instead of several years behind, has been due to the intricate nature of the several income tax laws.

each of which has raised new questions and created new problems. In order to dispose of the old tax cases the commissioner either will have to have broader powers of compromise and settlement or a special board of tax adjustment will have to be created to take over all the old cases and leave to the income tax unit only the cases arising under the 1921 and 1924 revenue acts. It may be that the new revenue bill will grant broader powers to the commissioner and this would help; although a better solution would be to create a special board, and thus separate the cases of 1916 to 1921 from those of 1922 and later years.

The outlook for an early settlement of old cases is not very hopeful. The new tax bill probably will not help the situation very materially. Taxpayers will find it necessary to continue their employment of expensive special assistance in handling their tax matters for many years to come. The new tax bill will not alleviate to any considerable extent the administrative difficulties that breed controversy and litigation. The report of the Senate Investigating Committee probably will furnish few, if any, constructive recommendations in this regard. Thus, taxpayers may expect to encounter the same difficulties they have met in the past in the settlement of taxes.

NO SUCH DANGER

IN THE early days of the labor union movement in this country, there were conspicuous instances of such violent disputes between unions and corporations that the result was to destroy both. On the surface, it might seem that one such struggle is in progress between the anthracite operators and miners. That is, on the surface, it might look as though the anthracite operators could not deal with the union, on present proposed terms, without destroying the industry. And, on the surface, it might look as though the union would insist on its impossible proposals far enough to destroy itself. Therefore, on the surface, it might seem entirely possible for both of these contending interests to ruin themselves. While giving full weight to what seems possible, it nevertheless must be said that there is no such danger.

In the first place, there is, on the part of the anthracite operators, no mood or disposition to destroy the union. The operators recognize the value to themselves of their own associated efforts designed to improve their own conditions. Being logical, the operators recognize that there must be some value to the miners in their own association designed to improve their own condition. The right to organize is equal on both sides; presumably the value of such organization is at least as great to the miners as it is to the operators. So there is no disposition on the part of the operators to prevent the formation by the miners of such an association; certainly there is no disposition to destroy that which already has been organized. Without malice and without objection to the union as such, there is no reason to expect a destructive war over mere details of wages or methods of procedure.

Furthermore, there is an understanding on the part of both the miners and the operators that their mutual reliance is upon the public. It has now become all too apparent that the public resents the present price of anthracite and that it will not consent to a percentage advance in that price at each wage-determining period. The operators long have known that these percentage increases in cost must some day reach a point beyond which they could not go. The miners in the anthracite field are above the average of intelligence and must have

appreciated the same fact. When both sides appreciate the same point and when the public has so definitely and clearly expressed itself, it is beyond belief that the opposing groups will continue their quarrel to the point of destroying the industry which supports both of them.

For these two reasons there is no such issue as would cause either to seek to destroy the other or as would cause both to continue their strife to the point where they both destroyed the thing that is precious to both. The struggle over details, at the moment, is so intense as to arouse the bitter passions of both. But these passions have not passed beyond the point of any possible restraint. Indeed, such feeling as may have seized upon either side to the controversy has about spent itself. The situation is reaching the point where calmer judgment is sure to prevail.

Specifically, both sides have begun to discuss those points upon which an agreement is possible. Having started to consider such questions as how interruptions of supply may be prevented and other similar questions upon which an agreement may quickly be reached, it is hardly too much to say that ways will be found for the dissolution of this dispute before it has reached the destructive point. We may, therefore, dismiss the fear that this strike will destroy either the miners' union or the anthracite industry. It will chasten and reform the union. It will give anthracite a serious business problem to solve. Neither side will escape unscathed. But neither side will be ruined.

OBSTRUCTING PROGRESS

THE burden of the recent meeting of the Illinois Mining Institute was that if Illinois coal operators expect to compete with non-union mines, it will be necessary for them to adopt mechanical equipment, particularly loaders, to reduce operating costs. It was also brought out that in order to do this, union labor's position regarding mechanical equipment must be "softened," and coal cleaning methods generally adopted. John A. Garcia, who introduced the subject of mechanical loading to the meeting, said "Many coal operators have persisted in the old method of doing this work as we used to do it fifty years ago. Mechanization of coal mines is at our door. Are we going to open the door or are we going to let this opportunity pass on?"

Before Illinois coal operators can "open the door" and successfully compete with other states it will be necessary for them to overcome more than union opposition to loading machines. A law recently enacted by the state legislature says that "any new method of mining during the experimental stage shall be under the direct supervision of the State Mining Board, by and through their consent *only*."

It is apparently within the power of the Illinois State Mining Board to prohibit any method of mining that does not suit its fancy, no matter how effective the plan may be or how successfully it has worked in other states.

If an operator desires to change the method of cutting break-throughs or of installing an overcast or to standardize track gauges, it may not be done without the consent of the State Mining Board.

The law automatically puts every mining operation underground under the direct supervision and control of the State Mining Board, a body of men politically controlled.

In the November issue of this Journal were three articles upon the efficient handling of materials underground in metal mines. There was also an article on mine track work and materials, showing a decided

change in mining equipment and methods. These articles show the serious problems that must be overcome, to arrive at efficiency and economy in production, and they should not be added to by putting autocratic authority in the hands of any board. The operating man has sufficient grief already without adding political burdens.

Illinois coal operators have been leaders in the adoption of economical coal production methods. Orient No. 2 mine, of the Chicago, Wilmington & Franklin Co., holds the world's tonnage record of 11,325 tons in eight hours. Illinois producers were among the first to adopt mechanical loading, although their success generally has been more or less indifferent on account of union opposition. In recent years there have been radical changes in mining methods and if mechanical equipment is to effectively supplement hand labor, new methods must be worked out to suit that equipment.

In the discussion at Cincinnati last May it was plainly shown that adaptation of mining methods to mechanical equipment was a major problem. Certainly no one political board should have it in its power to prevent progress in the development of economical handling of materials and supplies, and the working out of new methods of mining.

LET BUSINESS ALONE

INDUSTRY has been awaiting patiently the day when President Harding's famous "Less Government in Business and More Business in Government" should become a reality. The amazing progress of the antithesis of this slogan, with bureaucracy extending itself in an alarming manner in federal, state, county and city governments, has brought about such a protest from industrial leaders that it has finally crystallized in a mass meeting to be held in the Nation's capital, in which three hundred trade associations have been invited to participate.

Apparently the Administration is with the majority. President Coolidge in his recent address before the New York Chamber of Commerce, said:

"When Government enters the field of business with its great resources, it has a tendency to extravagance and inefficiency, but having the power to crush all competitors, likewise closes the door of opportunity and results in monopoly."

In this issue Secretary of Labor Davis speaks for the Administration in coal matters, and urges that industry be let alone in working out its problems; that nothing can be gained by government meddling in private affairs.

Secretary of Commerce Hoover, in an address before the National Association of Railroad and Utilities Commissioners, warned against the constantly growing tendency to pass on to Washington the problems that should be solved by the states and the people themselves. He urged decentralization of government in Washington and the restoration to the individual states of matters that should be solved by the states.

These utterances pretty definitely show the administration's attitude.

The purpose of our government is to protect us against foreign aggression, preserve the peace, regulate commerce between the states, provide and maintain a stable and elastic circulating medium, and enforce the decrees of the courts. These, in our opinion, sustained by that worthy document of our forefathers, the Constitution, are the major functions of government.

Government control of any business means political

control of that business. And political control means extravagance and waste. The government should not engage in any industrial pursuit that can be handled by private capital; and private capital must not be handicapped and forced to compete with any industry that is subsidized and sustained through taxation of other industries.

What is right and proper for individual enterprise becomes wrong in principle for the government; i. e., the fundamental purpose of a business is to deliver to its customers either merchandise or service at a legitimate profit, and a surplus built out of the profit is legitimate, desirable and necessary to our industrial prosperity and the expansion of business; the fundamental purpose of a government is to deliver to its citizens protection and justice, without a profit, and a surplus acquired through taxation is both vicious and dangerous.

America, the greatest nation of the world, has grown to its magnificent manhood, in a comparatively few years, on a full diet of individualism. That policy, laid down by the founders of our country has not been wrong. We are a great, a mighty and a blest nation. Nations with as great resources, nations with even greater opportunities, that have chosen to follow socialistic doctrines are today at the bottom of the world's list.

With both major political parties declaring against government competition with private enterprise; with the present administration definitely against any policy which forces industry to pay taxes to sustain competition against itself, it would seem that the 69th Congress will be hesitant in advocating legislation that will foster further encroachments and that there will be a general effort toward decentralization of government activities, giving back to the states certain matters that are primarily the state's business; and the confining of government to its proper function—aid to its constituents—not competition with them.

It is perfectly natural for bureau officials to wish to fortify their positions and extend their activities to the point of indispensability. If industry wishes to prevent further encroachments by government in business they may, by setting up such high standards and ethics and by voluntary cooperation within the industries in maintaining those standards, eliminate the source of the trouble.

ENLARGING THE TASK

IT IS obvious that coal consumption in the United States has not stopped; it has not even slowed down within the last few years. Therefore, in the aggregate, coal production has continued at the normal rate. That being true, if the union bituminous mines have been closed—which has been the case—some other mines have had to produce the coal. That has caused an increase in production—and hence, of productive capacity—on the part of the nonunion bituminous mines.

Today, with consumption continuing, as usual, the anthracite mines are closed. Therefore, the nonunion bituminous mines have had further to increase their productive capacity. Thus, we have had two shutdowns of our union mines and two increases of production on the part of nonunion mines.

We entered this situation with too many mines and too much productive capacity. We now have increased that productive capacity, and hence have increased the number of existing mines. If we ever get around seriously to the job of trying to liquidate some of our excess productive capacity, it is obvious that we are

going to have a larger job to do than we would have had if the job had been assailed intelligently two years or more ago.

It was strikes of miners which caused the excess productive capacity in the first place. It is strikes of miners which is increasing the productive capacity of mines today. We cannot, therefore, have even the beginning of liquidation or the end of the creation of new mines until, by some method, we have eliminated strikes of miners.

IMPUDENCE OR WHAT ?

UNDER date of November 21, John L. Lewis of the miners' union, dispatched a letter to President Coolidge which ended as follows:

"In all respect, the mine workers now inquire whether the Federal Government desires to intervene to maintain the morality and integrity of the existing agreement in the bituminous coal industry.

"If it should occur that the Federal Government is disposed not to intervene for the protection of a meritorious wage agreement, might the mine workers believe that their own efforts in that direction may be considered as being justified."

Among those who have proper respect for the presidential office, it is understood that those who address letters to the Executive are expected to withhold them from the public unless and until the President himself publishes them. To do otherwise is to subject the head of our government to the grave embarrassment of having citizens use the White House as a vehicle to carry their own views on public conduct to the people. In the case in hand, Mr. Lewis ignored these sensible and decent conventions.

It is impossible to read the quoted sentences of that letter without gaining, as the newspapers did, the impression that the union had submitted an ultimatum to the government. In almost so many words, the union had said that the government must discipline the bituminous operators to compel observance of the Jacksonville scale or the miners' union would do that thing itself, perhaps by calling a general strike of the bituminous miners. As a general rule, this country is not much given to condoning ultimatums launched by any organized groups at the government.

The conduct of the miners' union has reached a point of danger when it takes the form of delivering an ultimatum to the government. It has become a serious question whether such conduct is the product of ignorance or of impudence. The tendency in some quarters is to put the latter construction upon it.

Direction has been given to the public thought upon the Lewis letter by a curious inconsistency in it. Mr. Lewis was addressing himself to a contract existing between his union and the operators. He was saying that this contract had been violated. He was insisting that the contract be honored as written and signed. Those who have suffered from broken contracts do not, as a rule, rush to the White House with the story of their wrongs. Instead, they go through the prescribed routine into the courts which are constituted for that purpose.

If, as Mr. Lewis says, this is a simple case of a broken contract, it would seem that the proper lodgment for his complaint would be in the courts of proper jurisdiction. It is, then, a question why he did not direct his appeal in the proper channel.

The fact seems to be that Mr. Lewis has been, recently, to court once too often. Indeed, the whole character of his union has, but recently, been passed upon by the

U. S. Court for the Southern District of West Virginia. In a finding of facts by that court, the union is held to be unlawful as to its major purpose; its course of conduct; and, the means by which it finances its operations. With such a judgment standing against it in one court, it is not to be wondered at that the union did not carry its contract difficulties into another court. However, it remains something of a mystery how the miners' union could have supposed that with the Federal courts thus condemning its conduct, the administrative branch of the government could intervene in its favor to save it from the wrath of an aroused body of coal consumers.

AN INDUSTRIAL HIATUS

FIGURES showing the coal production of the world have just been compiled into the following enlightening tabulation:

1913—	1,195,000,000 gross tons.
1923—	1,180,000,000 gross tons.
1924—	1,167,000,000 gross tons.

The output in the United States was 509 million tons in 1913 and 512 million tons in 1924.

Both national and world figures put peculiar emphasis on the fact that, for over a decade, there has been, apparently, no increase in the use of industrial power made from coal.

The American railway figures are curiously eloquent to somewhat the same effect. That is, the railroads have spent about two billion dollars for improvement in their facilities for handling freight. And yet, the number of cars loaded has not increased materially, if at all, in the last five years. Fluctuations in weekly loadings today are about the same as they were at the beginning of the five-year period.

It is interesting to inquire whether business has stopped growing or whether people are merely turning to other sources of power and to other forms of transportation. In this country it is true that we have developed a vast amount of hydro-electric power and have effected enormous fuel economies by rebuilding our power plants. In this country it is also true that we have transferred much business from the railroads to motor trucks. Both of those conditions are purely local and do not govern around the world. And yet, the figures here which show no gain in power consumption are practically matched by the figures of the world, namely, there has been no appreciable growth. To a extent, this can be accounted for by the fact that we have reached a point in our industrial development where growth may be slower than it was during the last generation. This is true around the world. The graduation from a period of development into a period of maturity might account for a slowing down from an annual increase of 9 percent to 10 percent to a normal increase of 4 percent to 4½ percent. It could not account for the fact that there has been no increase at all.

On the contrary, the figures point eloquently to the fact that something has gone wrong in our industrial structure. It lacks the vigor which it had a decade ago. Its growth has become stunted. Perhaps an explanation for this phenomenon will be found in the fact that never in world history has the labor problem been so acute as now, and never have the workers of the world been so thoroughly organized as now. This is matched by the fact that never in history have governments been so swayed by the demands of labor as at the moment. Indeed, labor and government seem to be almost two expressions of the same thing. When the cause is thus fairly clear and when the effect is to stop the growth of

business around the world, the indication is pretty clear also that the alliance between the force of government and the force of organized labor is dangerous to the body commercial.

NO STRIKE WAS DECLARED

D. W. BRUNTON, eminent mining engineer, furnishes an illustration from the past that is particularly appropos in these months of strife in the mining industry, with actual and threatened strikes featured daily in the headlines.

Mr. Brunton recalls an incident in the early days in British Columbia, when the chief executive of the Province was a Crown-appointed official known as the Gold Commissioner, when a decision was rendered on the strike question, which covered the subject so completely that it ought to be more widely known.

When the United States troops drove the Molly McGuires and the Western Federation of Miners out of the Couer d' Alenes, most of them in order to avoid arrest fled to British Columbia. To make things homelike they soon organized a miners' union, and when a sufficient amount of money had accumulated in the treasury to excite the cupidity of the leaders, preparations were made for a strike. As most of them were strangers in the country, they concluded it would be wise before calling a strike to ascertain what would be the ruling of the Gold Commissioner on the strike question. Accordingly a committee was appointed to call on Captain Fitzubbs, who was at that time Gold Commissioner. These men explained to the Commissioner that they were a committee from the miners' union, which was dissatisfied and wished to declare a strike, but before doing so they would like to know what his attitude would be. He turned around from his desk, faced them squarely, and said:

"Gentlemen, you may quit work singly or together whenever you see fit, and no man shall dare to ask you a question."

Most of the men on the committee had been in the strike business for some time and knew that a ruling of that kind would not get them very far, and after consulting with each other for some time in the corner of the room they came back to the Commissioner with what they really wanted to know—if they went on a strike could they persuade or prevent other men from taking their places? The Commissioner jumped up, pointed his finger at the spokesman, and said:

"Gentlemen, that is another proposition. The first man in this country who attempts to dictate what another man shall do gets 10 years." Then he opened the door.

It is needless to say that no strike was declared, and if we had an effective ruling of that kind in this country strikes would soon be a relic of past barbarism, and a new era for labor would be on its way.

Just what attitude Mr. Coolidge will take in regard to Mr. Lewis' impudence is not known as we go to press. But the precedent he set in the Boston police strike leaves little to anticipate.

TAX EXEMPTION

WHILE Congressional Committees are deeply engrossed in working out National tax reduction, the Governor of Wisconsin gets away to a flying start with his recent announcement of "No state tax in Wisconsin. Next year the people will not be asked to pay any tax for state purposes."

An analysis of the Governor's announcement shows that the suspension applies to property taxes only, and that the move is purely a political one, designed to help the farmer. The result will be merely a shifting of the tax burden from one class to another, for any reduction in the property tax will undoubtedly be made up in the state income tax levy.

We believe in lowering taxes, both state and national, to the lowest possible point consistent with good government. State taxes have been and still are too high. But will the shifting of the tax burden from one class to another make for stronger morale in state affairs?

A nation under-taxed is in a worse condition than a nation over-taxed. People will fight over-taxation but they will sustain to the point of apathy and stagnation under-taxation.

It is a human tendency to wish to keep all we get—to care little how much the other fellow is taxed, if we are free. But a government that permits that sentiment to grow or to control is a weak government. Any government is only as strong as its weakest link, and if any large majority of the people are relieved from the payment of taxes for the support of government, the government itself is in the early stages of decadence.

The man who is relieved from all responsibility for the support of his family soon becomes an indifferent father; the business man who has no responsibility in the maintenance of his business soon becomes disinterested in its success, and the citizen who is completely divorced from any responsibility for his government, except compulsory respect for laws enacted by it, will become indifferent to that government. Indifference leads to unrest, unrest to anarchy, and anarchy to annihilation.

There is a constantly growing element that wishes to saddle upon the few the entire burden of government. Every session of Congress sees its quota of bills designed to relieve the people from any responsibility in government; every day new proposals are made advocating taxes for the well-to-do and absolution for the rest of us—and we have finally reached the point in the present discussion concerning national tax reduction, of relegating to "the rest of us" all whose incomes are below \$5,000 annually.

In New England two leading newspapers recently brought forth a brilliant idea, which advocates that while business is prosperous it should be taxed to the limit to take care of any lean years that are to come. Every citizen of the United States should pay a tax, not necessarily a large one, but a sum that will force him to think about his government (even uncomplimentarily), that will make him feel that he is a part, however small, of that government, that will assure his interest in government and therefore his loyalty to those principles he wishes to see govern.

State exemption from taxation is as bad for the nation as national exemption, for loyalty, pride and respect for this country begins in the local communities, the cities, counties and states. Wisconsin should not wave an exultant banner. Her feet are not upon the solid path to Utopia.

EXCERPTS FROM ADDRESS OF MR. L. S. CATES

PRESIDENT, THE AMERICAN MINING CONGRESS

As American mining men we naturally give first attention to the world situation when we consider the state of our industry. Our dependence on other nations for the maintenance and expansion of American mining is so important a fact that we can make no competent survey of our own situation without knowledge of foreign as well as domestic conditions.

Our knowledge of the foreign conditions that most intimately affect us is not ideally complete, but we have enough to indicate that reconstruction has become more than a hope or a prospect within the past year; that it is at last a moving fact with increased promise.

The fact that many foreign national debts have been funded or are in process of funding would of itself be substantial encouragement to us who must seek markets overseas, yet this is only one of several indications that the foreign customer nations of the American mining industry have their task of rehabilitation well under way and are rapidly stabilizing their finances and business, public and private. We have already felt the effects directly in our industry and can expect increased benefits as time passes. Although most operations have not yet reached the post-war basis where the spread between cost and income is equal to what it was prior to the war, the trend is clearly that way. Steady improvement rather than sudden change is indicated.

The year at home has been generally uneventful in the industry. Markets were somewhat improved in many instances and operations were fairly steady in the metal mining field. The year was not generally satisfactory in the coal mining field, which continues to suffer as the result of too much attention from people that know too little about it.

It is a gratification to note that the agricultural situation has greatly improved, after several unsatisfactory years. Agricultural prosperity benefits industry in general, as well as those directly engaged in farming and allied activities. The farmer and the miner have much in common and are usually together in prosperity and adversity.

The industry is to be congratulated on the existence of a medium so well organized and equipped for expression and action as the American Mining Congress. The vision, persistence and sacrifice of a handful of men through the early years of its existence have made available for us today an institution without which we should be gravely handicapped in our efforts to meet the many and difficult issues that have confronted us in the past few years and still confront us.

The American Mining Congress is the business organization of the industry and has important business matters to consider at this annual meeting. Each subject will have attention from men qualified to discuss it and we know the action taken will be in accord with the sane and reasonable attitude the Mining Congress always takes.



TWENTY-EIGHTH ANNUAL CONVENTION THE AMERICAN MINING CONGRESS

CONVENTION HEADQUARTERS--THE NEW WILLARD HOTEL, WASHINGTON, D. C.

Program

WEDNESDAY, December 9th

9.00 A. M.—Registration of Delegates, New Willard Hotel.

10.00 A. M.—First General Session of the Convention.
Presiding Officer—L. S. CATES, President of the American Mining Congress.
By L. S. CATES, President.

"The Mining Industry and Its National Organization"
Reports of Committees.

"Survey of Mining Conditions"

Speeches by representative operators from different districts:

STANLY A. EASTON, Bunker Hill & Sullivan Mining and Concentrating Co., Kellogg, Idaho.

JESSE McDONALD, President, Colorado Metal Mining Fund, Denver, Colorado.

ALBERT J. NASON, Illinois Coal Corporation, Chicago, Ill.

Formation Resolutions Committee.

12.30 P. M.—Informal Luncheon for delegates attending the Convention, New Willard Hotel.

2.00 P. M.—Second General Session of the Convention.

"Mine Taxation"

Presiding Officer—PAUL ARMITAGE, Chairman General Tax Committee of the American Mining Congress.

"Federal Tax Legislation"

By HON. JOE J. MANLOVE, U. S. representative from Joplin, Mo.

7.30 P. M.—ANNUAL BANQUET OF THE AMERICAN MINING CONGRESS, New Willard Hotel.

Toastmaster—L. S. CATES, President.

Speaker—HONORABLE HERBERT C. HOOVER, Secretary of Commerce.

THURSDAY, December 10th

10.00 A. M.—Third General Session of the Convention.

"The Mining Industry and Labor"

"The Bituminous Coal Industry As I See It"

By HONORABLE J. J. DAVIS, Secretary of Labor.

"The Protection of Public Rights in Industrial Disputes"

By HONORABLE JAMES MURDOCK, former Minister of Labor, Ottawa, Canada.

"Position of the Anthracite Coal Operators"

By S. D. WARRINER, President Lehigh Coal & Navigation Co., Philadelphia, Pa.

"What is a Fair Wage?"

By SIDNEY J. JENNINGS, U. S. Smelting, Refining & Mining Co., New York, N. Y.

Discussion.

Introduction of Resolutions.

12.30 P. M.—LUNCHEON OF BOARD OF DIRECTORS OF THE AMERICAN MINING CONGRESS, New Willard Hotel.

2.00 P. M.—Group Conferences.

General Meeting Standardization Division.

Presiding Officer—COL. WARREN R. ROBERTS, Roberts & Schaefer Co., Chicago, Ill.

4.30 P. M.—ANNUAL MEETING OF MEMBERS OF THE AMERICAN MINING CONGRESS, Room 841, Munsey Building.

Evening—

FRIDAY, December 11th

10.00 A. M.—Fourth General Session of the Convention

"The Value of Cooperative Effort in the Mining Industry"

By HONORABLE WILLIAM E. HUMPHREY, Commissioner Federal Trade Commission.

Discussion.

12.30 P. M.—LUNCHEON OF MEMBERS OF THE MANUFACTURERS DIVISION OF THE AMERICAN MINING CONGRESS, New Willard Hotel.

2.00 P. M.—Fifth General Session of the Convention.

Report of Resolutions Committee.

Discussion.

4.00 P. M.—ADJOURNMENT.



PROSPECTS FOR INCREASED SILVER PRODUCTION

Prospects Of Silver Are Bright—Demand For Its Monetary Use Is Increasing And Campaign For Its Use In The Arts Promises Satisfactory Results

By F. H. BROWNELL*

THE Editor of the MINING CONGRESS JOURNAL has asked me to contribute an article upon the subject of the future of silver, especially the outlook for 1926. Obviously, it would be rash to venture any prediction as to the actual price of silver for any such period. The subject can only be treated in the broadest way from the fundamental standpoint of supply and demand and the probabilities, or rather possibilities, inherent in that situation.

The production of silver in the United States and outside of the United States, and the price of silver, are shown in the table below, covering the last five years.

This table is quite suggestive. It shows a considerable increase in the production of silver between 1920 and 1924, but it is significant that the production of 1923 and 1924 was relatively the same. Apparently, at prices approximating 65 cents to 70 cents for silver, there is little change in the output, except as it is affected by the rate of production of lead and copper, with which so much silver is now associated.

Looking at the subject, therefore, from the standpoint of newly mined supply, we may conclude that the prospects of the supply of silver for the year 1926 are approximately those existing during the period above mentioned and that, so far as the newly mined silver is concerned, there is nothing from which we may expect any unusual or abnormal effect upon price. Any variation in prices prevailing in 1926 will probably be more dependent upon demand than upon supply.

Let us pass, therefore, to the second aspect of our subject; namely, the demand for silver. This, obviously, is divided into two classes—demand for monetary purposes and demand for the arts.

Monetary Purposes. The outlook for the future demand for silver for monetary

purposes continues to brighten. At the close of the war, much anxiety was felt in this respect. The effect of the war had been to demonetize silver in all the European countries engaged in the war, with the exception of England,



F. H. Brownell

and in the case of England and most of the non-participating European countries and many others in Central and South America, the fineness of silver used for coinage was greatly decreased; in the case of England, for example, dropping from 900 to 500 fine. In effect,

this meant that, if England continued to use the same amount of silver for its coinage purposes (and it is a fact often not generally realized that England uses, per capita, a larger amount of silver than does the United States), the amount of silver thus consumed, for the same number of coins, would be 5/9, or, say, 55½ percent of the amount of silver that would have been used before changing the fineness.

When financiers and economists began to consider the restoration of the deranged money systems of many countries of Europe, they were at first inclined to believe it unnecessary to restore silver to a part of their monetary systems. Austria is an example. The original plan for the stabilization of its currency contemplated no silver, but the substitution either of paper or hard token coins, aluminum, etc., in lieu of the silver coinage. Fortunately, it soon became apparent that financiers and economists alike had overlooked the psychology of the poorer classes. There was a persistent and imperative demand for silver by these classes. The Austrian peasant had seen the money in which he once proudly believed pass from its former par value to nothing. It was a most bitter lesson. These people do not keep their savings in banks. Their savings are not of sufficient amount individually for that purpose, but, in the aggregate, they run to vast sums of money and are hidden in the homes. Gold cannot answer the purpose, because it cannot be subdivided into coins of a value equivalent to 10 cents, 25 cents or 50 cents. The savings of these people are in the small amounts at a time. It soon became evident that the habits of thrift were becoming utterly destroyed because of the lack of a medium for small savings in which the people had confidence. Most of them had been forced to part with the silver which they had previously saved. They had found that this silver did have an actual value, when token and paper money had become absolutely worthless, and they demanded restoration—silently perhaps, but none the less effectively—of a silver currency.

In short, Austria was compelled, in order to preserve the thrift habits of her lower classes, to reestablish the coinage of silver. The same experience was had by Germany, and even by Russia. No (Continued on page 588)

PRODUCTION (Ounces)

Country	1920	1921	1922	1923	1924
United States	55,361,573	53,052,441	56,240,048	66,163,338	64,221,655
Canada	13,330,357	13,543,198	18,626,439	18,601,744	20,243,846
Mexico	66,516,354	64,465,347	81,076,899	90,810,855	91,437,944
Total North America	135,208,284	131,060,986	155,943,386	175,575,937	175,903,445
Central America and West Indies	2,700,000	2,000,000	2,500,000	3,000,000	3,500,000
South America	14,611,368	15,500,610	21,398,185	27,354,642	27,952,000
Europe	8,382,592	8,070,072	8,517,214	8,780,896	10,000,000
Oceania	2,164,854	5,362,680	11,484,734	13,805,865	11,000,000
Asia	8,900,272	8,868,005	9,374,987	9,989,507	10,999,943
Africa	1,233,248	1,010,893	1,314,996	1,545,167	1,580,301
Total for World	173,200,618	171,873,246	210,533,502	240,052,014	240,935,689

AVERAGE NEW YORK PRICE

100,000*	62.654*	67.528*	64.873*	66.781
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* The above prices are the New York prices for foreign silver during the period of the Pittman Act purchases from May, 1920, to June, 1923.

* First Vice President and Chairman, Finance Committee, American Smelting & Refining Co.

MINING INDUSTRY DEPENDENT UPON PROTECTIVE TARIFF

Those Mineral Industries Which Faced Readjustment After The War Have Been Greatly Assisted By The Protective Tariff, Which Has Stabilized Them, Either Directly Or Through Those Industries To Which They Sell Their Minerals

By HON. REED S. SMOOT*

THE mineral industry of the United States is vitally dependent upon the safeguards of the protective tariff. In two ways does the tariff so safeguard industry. The first and most obvious protection is that given in those mineral schedules themselves which provide the necessary differential between costs of production in the United States and in foreign countries, with which those minerals are in a competitive position.

The second safeguard is not so apparent to the casual observer, but is possibly even more important, that is the protection which is given by safeguarding the home market of the consumers of the products of mineral industry in processes of further manufacture.

Upon the continuous operation of manufacturing plants and the resultant increased use of known materials and new uses for basic materials the mineral industry must base its own continued development and prosperity.

It is of vital importance that such industries as the production of lead and zinc, for example, have the tariff protection which has been provided for them in the existing law and under which they thrive and develop. Equally important to the producers of copper and coal, both of which are on the free list, is that the whole structure of American industry have continuous, prosperous operation, for it is generally recognized that we can not sell the volume of copper which we should market, except to factories operating in the protected production of finished materials, and that we can not sell even coal to factories with idle smokestacks.

The protective tariff does not adversely affect the movement in international commerce of those basic materials of which we have a surplus. Foreign trade demands these basic materials in every form from the mined product to the finished article for human consumption. It is advantageous for all industry that the processes of manufacture be carried as far as is possible, so that as much value as can be, may be added to each commodity before it enters into foreign commerce.

The mineral industry is no longer an isolated mining operation. It is no longer a pick and shovel business which can be exemplified by a prospector and a burro. It is in itself a huge manufacturing operation. The heretofore simple proc-

ess of taking ore from the hills and sending it off to smelters for refining is being largely replaced by mining methods which in themselves are so complex as to constitute the manufacture of metals and mineral compounds from the true raw material; that is, ore in place. The huge mills in which copper is concentrated from low-grade ores, the refineries which recover not only the metals sought from the ores but all by-products of metallic recovery from fumes, dust, and slime, and the mills which, in turn, produce not only bar metal but rods, sheets, tubes, paints, pigments, fertilizers, acids, abrasives, and similar articles ready for intermediate and final consumption make up an intricate industrial operation with ramifications into every part of our industrial fabric.

There is also a highly important advantage to the user for whom these products are designed in the type of production which will insure continuous operation. Statistics over a period of years have shown that in a group of protected mineral industries, as contrasted to a group of unprotected mineral industries, the range of price fluctuation in those industries which were protected is much less than in those which were unprotected. This is of advantage not only to the producer of the minerals but also to the ultimate consumer.

The manufacturer must provide in his range of costs for possible costs which reach the peak of prices on his purchase account. Those industries which are characterized by wide extremes of price, periods of feverish activity and stagnation, show no benefit to the consumer by the low prices which caused this stagnation.

For example, in 1918, when the price of quicksilver ranged upward from \$100 per flask, the price of detonators made from fulminate of mercury, and which consumed about 65 percent of the mercury produced, was \$16 per 1,000. In 1921 and 1922, with mercury at \$30 to \$35 a flask, the price of the same detonators was \$18 per 1,000 and today?

Such illustrations might be repeated endlessly, and the manufacturer is in no way at fault because he must provide against such cost fluctuations. The important thing to the consumer is that under a protection which guarantees a smooth price level the cost of the finished product which he buys is over a period of years at a much lower range of cost price than in unprotected industries.

Unquestionably, those mineral industries which faced readjustments after the war have been aided in their readjustment by the protective tariff, which has stabilized them either directly or through the industries which they must supply with material.

UNITED STATES RATES OF DUTY—FORDNEY-McCUMBER TARIFF OF 1922 (27 Minerals)

Fordney Tariff of 1922 Sched.	Par.		Underwood tariff of 1913	Fordney tariff of 1922
ANTIMONY—				
15	1508	Ore	Free	Free
3	376	Needle or liquated	10 percent	1/4c per lb. (5.33%)
3	376	Regulus or metal	10 percent	2c per lb. (32.26%)
ARSENIC—				
3	379	Metallic	Free	6c per lb. (31.03%)
15	1512	Sulphide (real gar and orpiment) ..	Free	Free
1	1	Arsenic acid	Free	3c per lb. (10.41%)
15	1513	Arsenious acid (white arsenic)	Free	Free
15	1515	ASBESTOS, unmanufactured	Free	Free
1	69	BARYTES ore—		
		Crude	15 percent	\$4 per ton (73.65%)
		Ground	20 percent	\$7.50 per ton (49.49%)
3	377	BISMUTH	Free	7 1/2 percent
3	378	CADMIUM	Free	15c per lb. (22.25%)
15	1547	CHROMITE or CHROME ore	Free	Free
FELDSPAR—				
15	1619	Crude	Free	Free
2	214	Crushed or ground	20 percent	30 percent
2	207	FLOURSPAR	\$1.50 per ton (12.41% 1920)	\$5.60 per ton (46.05% 1924)
GRAPHITE or Plumbago, crude or refined—				
2	213	Amorphous	Free	10 percent
		Crystalline lump, chip, or dust	Free	20 percent
		Crystalline flake	Free	1 1/2c per lb.
2	216	Manufactures of graphite, N. s. p. f. ..	20 percent	45 percent
GYPSUM—				
15	1643	Crude	10 percent	Free
2	205	Ground or calcined	10 percent	\$1.40 per ton
14	1440	Mfgs. of (except cement)	25 percent	35 percent
		Cement (Keene's and other)	10 percent	\$3.50 to \$14 per ton
2	207	KAOLIN (China clay)	\$1.25 per ton	\$2.50 per ton

*United States Senator for Utah.

**UNITED STATES RATES OF DUTY—FORDNEY-McCUMBER TARIFF OF 1922
(27 Minerals)—Continued**

Fordney Tariff of 1922 Sched. Tar.			Underwood tariff of 1913	Fordney tariff of 1922
LEAD—				
3	392	Ores & matters (on lead content)...	¾c per lb.	1½c per lb.
3	393	Bullion or base bullion, lead in pigs and bars, lead dross, reclaimed lead, scrap lead, antimonial lead, antimonial scrap lead, type metal, Babbitt metal, solder, and all alloys of lead (on lead content).....	25 percent	2½c per lb.
3	393	Lead in sheets, pipe, shot, glaziers lead and lead wire.....	25 percent	2½c per lb.
3	399	Manufacturers of lead, n. s. p. f.....	20 percent	40 percent
LIME—				
2	203	Hydrated	5 percent	12c per 100 lbs.
		Other	5 percent	10c per 100 lbs.
MANGANESE—				
3	302	Ore or concentrates containing in excess of 30% of metallic mang....	Free	1c per lb. on metal content
MAGNESITE—				
2	204	Crude	Free	5/16c per lb.
		Caustic calcined.....	Free	¾c per lb.
		Dead burned and grain.....	Free	23/40c per lb.
MARBLE—				
2	232	In block, rough or squared only.....	50c per cu. ft.	65c per cu. ft.
		Sawed or dressed.....	75c per cu. ft.	\$1 per cu. ft.
		Slabs and paving tiles.....	6 to 10c p. sup. ft.	8 to 13c p. sup. ft.
MICA—				
2	208	Unmanufactured—		
		Valued not above 15c per lb.....	4c per lb.	4c per lb.
		Valued above 15c per lb.....	25 percent	25 percent
		Cut or trimmed, and splittings.....	30 percent	30 percent
		Plates, and built up mica.....	30 percent	40 percent
		Manufactures of mica.....	30 percent	40 percent
		Ground mica.....	15 percent	20 percent
3	302	MOLYBDENUM—		
		Ore or concentrates.....	Free	35c per lb. on metal content
MONAZITE AND THORIUM—				
15	1621	Monazite sand and thorium ores.....	25 percent	Free
1	89	Thorium, nitrate, oxide & other salts.	25 percent	35 percent
15	1677	PYRITES	Free	Free
PUMICE STONE—				
2	206	Unmanufactured—		
		Valued \$15 or less per ton.....	5 percent	1/10c per lb.
		Valued over \$15 per ton.....	5 percent	¾c per lb.
		Manufactured	¾c per lb.	55/100c per lb.
		Manufactures, of, n. s. p. f.....	25 percent	35 percent
1.15		POTASH—		
3	386	QUICKSILVER	10 percent	25c per lb.
2	209	TALC—		
		Crude and unground.....	Free	¼c per lb.
		Ground, washed, powdered, or pul- verized	15 percent	25 percent
3	302	TUNGSTEN ore or concentrates.....	Free	45c per lb. on metal content
3	394	ZINC ORE— Containing		
		less than 10% of zinc.....	10 percent	Free
		10% and less than 20% of zinc.....	10 percent	¾c per lb. on zinc
		20% and less than 25% zinc.....	(on zinc content)	1c per lb. on zinc content
		25% or more of zinc.....	15 percent	1½c per lb. on zinc content
	395	Zinc in blocks, pigs, or slabs.....	15 percent	1½c per lb.
	395	Zinc in sheets—		
		Not coated.....	15 percent	2c per lb.
		Coated with other metals.....	15 percent	2½c per lb.
	395	Zinc dust.....	15 percent	1½c per lb.
	395	Old & worn out zinc (fit for remfg.)	15 percent	1½c per lb.
	399	Manufactures of zinc, n. s. p. f.....	20 percent	40 percent

PROSPECTS FOR SILVER
(Continued from page 586)

movement has yet been made in either France or Italy to this end, but the same forces are working there as worked in the other countries, and it is only a question of time when France and Italy will be compelled to resume the coinage of silver.

We may, therefore, expect a steady resumption of the use of silver for money in Europe.

The demand of Asia, particularly of India and China, is always the controlling factor in the price of silver. India seems perfectly normal. The report is that the fall monsoons are fairly satisfactory and this will mean a normal crop in 1926, if nothing unexpected occurs. China is less assured. Its attitude may affect both demand and supply. China is in a chaotic state—how much so is not generally realized. The central government has practically disappeared. The nation seems to be splitting up into relatively small feudal governments. Some districts have suf-

fered heavily from famine, and in the lack of a central government, the surplus of supply of foreign countries is not so readily available for relief. China may possibly, but not probably, be a disturbing factor and not only may not require so much silver as heretofore, but even a part of the stock of silver accumulated by China in past centuries may again be offered for sale upon the market and China become an exporter, rather than an importer, of silver. The Chinese problem is probably the most important and most uncertain factor relating to silver, as we look to the year 1926.

Demand for the Arts. The use of silver in the arts has not kept pace in the last twenty years with the growth of population and of wealth, particularly in the United States. We are now using approximately 30,000,000 ounces of silver in the United States in the arts. We were using that amount many years ago. Why the use of silver in the arts has not kept pace with the growth of wealth and population is too long a

story to be entered into here. An important movement has, however, been started during the year 1925. The American Silver Producers' Association has joined with the Sterling Silverware Manufacturers' Association in a campaign of publicity in regard to silver. In the case of copper, a similar campaign by the Copper & Brass Research Association has been productive of a greatly increased demand for copper for many purposes for which its use had been abandoned. We may expect the same result to follow from the campaign for silver. Also, a very hopeful sign in this connection is the evident intent of the Silver Manufacturers to adopt modern methods of merchandising, and from this cause we may reasonably expect an increased demand for silver because of greatly increased consumption in the arts.

Summing up, therefore, we may conclude that, with the exception of the Chinese situation, about which no man can tell, the prospect of silver is bright and we may look forward to a satisfactory price for silver in the year to come; for the demand for silver, as money, seems now to be increasing, and so long as that tendency continues, one cannot but be optimistic.

Dr. W. O. Hotchkiss, newly elected president of the Michigan College of Mines, was one of the speakers at a recent meeting of the American Institute of Mining and Metallurgical Engineers at Iron Mountain. The importance of conducting at this time research work to make low grade ores commercially profitable was emphasized by Dr. Hotchkiss, who was formerly state geologist of Wisconsin. While the supply of high grade ores in the upper peninsula will last for some time, he said, they will eventually become exhausted and the only mineral resources left will be low grade. The task will require a long period and considerable money, he said, and should be undertaken before the supply of high grade ores is gone.

The State of Minnesota filed a brief in the Supreme Court defending its tax of six percent on ore royalties, which is attacked by the Lake Superior Consolidated Iron Mines; Royal Mineral Association and the Merrimac Mining Company. The state won the case in the lower court and the mining companies appealed to the Supreme Court, which will hear arguments on the suit December 7. Minnesota contends that it has power to tax royalties, as its constitution imposes no limitation on its taxing power other than that its taxes shall be uniform upon the same class of subjects. The tax is declared to be uniform in its operation and free from all the objections advanced by the mining companies.

STABILITY OF OPERATION AND EMPLOYMENT IN COAL

Voluntary Reduction In Number High-Cost Mines, Limitation Of New Mines, And Absorbing Surplus Mining Labor By Other Industries Not Easy Or Feasible Solution—Fact-Finding Commission Within The Industry Helpful—Should Be Permitted Adjust Own Problems

WE have given much thought and consideration in the Department of Labor to the questions constantly arising in the basic industry of mining coal.

How to meet the country's continued normal demand for this commodity at a fair price is a problem of the first importance to a great majority of our people and to every one of our industrial and transportation enterprises. Coal is the very basis and motive power of all our business pursuits. It is the first of all industrial needs, the matter above all others to meet consideration first.

We have failed to insure regularity of operation in the mining of bituminous coal for manufacturing, transportation and domestic use and this failure creates our greatest industrial problem. It is not a question of ability to supply the needed amount of coal, as there is no lack of miners or of mines. In fact we have too many mining operations, and too many miners and consequently a producing capacity far in excess of our needs. We are now in the midst of a suspension in anthracite mining that is driving many users of that fuel to the use of bituminous and coke for heating their houses for the time being.

At present the bituminous coal situation is better than it has been for some time, owing largely to the busy season for coal, and partly to the suspension in the anthracite fields. Our experience is, however, that as soon as hard coal is mined again, the great majority of former users will go back to it. Notwithstanding the occasional suspensions in the anthracite industry, the operators and miners engaged in that business are generally more fortunate in the relation of capacity to consumption than are the miners and operators in the bituminous industry.

During recent years many Federal, state, and private agencies have wrestled with the problems of "soft" coal. Committees from legislative bodies have gone into the mining conditions in various fields. During the war period, a Federal Fuel Administrator supervised the mining industry, succeeding a Fuel Produc-

Honorable JAMES J. DAVIS*

tion Committee of the Council of National Defense. Other expedients tried have been a Bituminous Coal Commission, several joint scale committee meetings under Government auspices, efforts



Hon. James J. Davis

on the part of governors of coal-producing states and other officials, Federal and state. Of whatever nature, they all have failed to solve the real basic problems that affect the industry—intermittency of operation, irregular employment, unprofitable production for owners and unsatisfactory earnings for workers.

The reasons for these and many other ills are conceded to be the result of overdevelopment and overmanning—too many companies, too many mines, too many miners. You may ask, then, "Why do not the 'too many companies' consolidate into fewer companies? Why could not the 'fewer companies' close some of the less profitable mines? And why do not

the 'too many miners' go into other lines of industry?"

The answers are not so easy. First of all, owing to irregularity of operation, the miners now in the industry are practically all needed at certain busy seasons during the year. The number of companies and miners cannot be regulated because there is nothing to prevent the opening of new mines, the organization of new companies, and the employment of miners, whether needed or not. While this is in harmony with our democratic views as voiced in the Constitution, still it is unwise economically. No legal restriction I know of can be invoked to prevent any person from adding as he sees fit to the already overdeveloped industry of mining coal. There is no legal restriction on any man to prevent him from becoming a miner. In a word, we have no means of controlling the evil which is conceded to be the industry's chief affliction. Over-development cannot be checked from without. I am convinced that the problems of the bituminous coal industry must be met from within the industry.

It would appear that within the industry real progress might follow the adoption of a scientifically developed plan for voluntary reduction in the number of high-cost mines, limitation of the new mines to be opened, an arrangement for absorbing into other industries the surplus mining labor, and a policy of discouraging the employment of casual mine workers in the busy seasons by confining such work to the steady employees of going concerns.

For this very difficult undertaking I believe that a Fact Finding Commission should be established within the industry itself. Such a commission, composed of leading minds from operators and workers, and animated by a spirit of cooperation and mutual trust, would be at once far more expert and better informed than any commission working from the outside. An inside body of this nature would possess a practical knowledge of every phase of the mining industry, from the mining to the marketing of coal, such as no other body of outside experts could (Continued on page 592)

*Secretary of Labor.

ANTHRACITE OPERATORS' REAL ATTITUDE TOWARD PUBLIC

As The Anthracite Strike Projects Itself Into Its Fourth Month The Public Is Inclined To Blame Equally Operator And Miner—What Is The Producers Attitude And How Far Is He To Blame For The Situation?—Mr. Warriner Definitely Answers These Questions

By S. D. WARRINER *

AS THE suspension of operations in the anthracite region drags along from weeks into months without any apparent efforts being made on the part either of operators or miners to resume negotiations or otherwise take steps to terminate the suspension and return to the producing of coal, the public is becoming apprehensive. And when the public begins to realize that its safety or convenience is being threatened it ceases to discriminate, or carefully to determine as to the parties responsible for the situation. So it is that at the present juncture we find the public inclined to say with Mercutio, "a plague on both your houses."

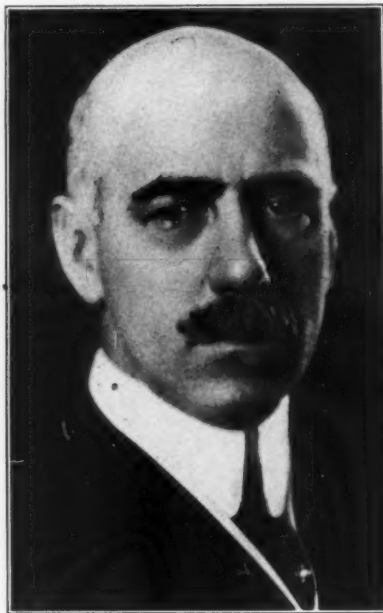
It may therefore be of interest to inquire into the extent to which the operators are responsible for the present situation, and what is their real attitude toward the public. Are they indulging in an internecine quarrel to the public's detriment, or is their policy designed not only to preserve the industry, but also directed toward public benefit and in harmony with public interest? The public are interested primarily in the anthracite industry in two ways—first, in being able to buy an adequate supply of coal when they want it and, secondly, in being able to buy it at a reasonable price. The operators' policy, I believe, has been directed toward the realization of these reasonable expectations of the public.

In my reply to the miners' demands presented at the joint conference of miners and operators at Atlantic City on July 9, and, as expressing the unanimous sentiment of the anthracite operators who had designated me as their spokesman, I said, " * * * We wish to urge that provision be made at the outset against the possibility of a suspension on September 1. Such joint action on our part would deserve public confidence. It can be accomplished by an agreement to the effect that if our respective committees are unable to agree upon any issues, such issues shall be referred to arbitration, upon the understanding that production shall be continued at the present wage scale until the arbitrators render an award."

It is to be noted that the first, and consequently the most important, feature of this proposition was that there

should be no interruption to mining operations; no limit was placed upon the time that negotiations should continue, and arbitration was to be resorted to only on those issues which could not be settled through direct negotiations.

The operators' position has been that in an industry like anthracite the principle of continuous service should be



Samuel D. Warriner

jointly recognized and a way found by which, without interruption of operation, differences between employers and employes may be satisfactorily adjusted. Such a policy is not only essential to the welfare of the industry, but is obviously in the public interest. For 20 years, from 1902 till 1922, the industry was governed by the practices of conciliation and arbitration laid down by the Roosevelt Commission Award, and new agreements were, with few exceptions, made at the termination of each contract by negotiation or arbitration without cessation of work.

No one will deny that during this time the mutual interests of employer and employe were protected, and the public interest in continuous service conserved. It is for a continuation of this practice

that the operators are contending in their opposition to the policy of the United Mine Workers which, since 1922, has forced three general strikes in an attempt to enforce their demands, arbitrarily declining all proffers of conciliation or arbitration. Not less than five times have the representatives of the operators offered to submit all matters at controversy to a court of arbitration.

In 1922, when negotiations had dragged along for weary weeks and when President Lewis had, as now, prohibited the operation of the mines, the operators proposed "a five-year contract," subject, however, to annual adjustments as to wage rates only, as follows:

"On February 1 of each year a joint committee of anthracite mine workers and operators shall meet to adjust wages, to be effective April 1 following, taking into account the following factors as a basis of adjustment:

"(a) Changes in the purchasing value of the wage earners' dollar within each year as determined in the anthracite region and surrounding territory by recognized standard authorities.

"(b) Opportunity for employment offered by the industry.

"(c) Wages and earnings paid in other basic industries under similar living conditions for corresponding service.

"(d) The general economic situation.

"In case no agreement shall have been reached by March 1, in any year, the determination of proper wage rates shall be referred to a commission to be composed of five persons to be selected by the Presiding Judge of the United States Circuit Court of Appeals for the Third Judicial Circuit, the personnel of the commission to be as follows:

"(1) A mining engineer and geologist, familiar with mining conditions and coal production, but not in any way connected with coal mining properties, either anthracite or bituminous.

"(2) An economist of established reputation who has not been employed heretofore by either party.

"(3) A judge of the United States Court for the eastern district of Pennsylvania.

"(4) A man who has been affiliated with and is representative of the labor movement in the anthracite field.

"(5) A man who by active participation in the mining and selling of anthracite coal is familiar with the physical

* President, Lehigh Coal and Navigation Company; Chairman, Anthracite Operators Conference.

and commercial features of the business."

This proposal illustrates the principle which the operators believe should be followed to insure continuous service.

The anthracite operators are unanimous in their support of their representatives of the Negotiations Committee, feeling as they do that in the stand the committee has taken, it is protecting not only the anthracite industry but the anthracite consuming public. The operators realize very forcibly that it is only in service to and fair dealing with the public that the industry can hope to survive. In the performance of that service the anthracite operators are now, because of the elimination of their product by the inexcusable suspension, advising householders in the anthracite consuming territory and who have not laid in their full winter's supply, to provide themselves with such substitutes as may be available, and have even instructed their combustion engineers in the cities where they are employed to lend their aid in the education of housekeepers in the most efficient use of such substitutes. Possibly—in fact, quite probably—customers for anthracite will be permanently lost, but in an emergency such as now faces the territory ordinarily dependent upon the anthracite mines for fuel, the most important thing is to prevent, if possible, actual suffering.

It is interesting to inquire into the causes which have led the Mine Workers' Union to decline negotiation, refuse arbitration and call strikes at the termination of each agreement for the past three years.

The reply to this inquiry appears to be that in its labor relations the anthracite industry is no longer autonomous, but is linked against its will with the troubles in the bituminous coal fields, although in its earlier dealings with the United Mine Workers it was distinctly agreed that anthracite should be independent and free from the complications affecting its competitive industry.

It is an anomaly that the same organization controls the labor, and to a certain extent, the destiny, of two competing industries, for bituminous coal, with its products of gas and coke, is a direct and a serious competitor of anthracite. In 1922 the anthracite operators were frankly advised that no agreement could be reached nor mining operations resumed until the trouble in

the bituminous field was settled. Within a few days after the bituminous operators had surrendered, the anthracite mines were in operation. There is good reason for the belief that consumers of anthracite will be deprived of their preferred domestic fuel for the remainder of this winter unless or until certain conditions in the bituminous field are

substitute fuels. Some of these markets have already been permanently lost. Others are being lost daily, which will be with difficulty, if at all, recovered.

In June, 1902, John Mitchell, speaking as President of the United Mine Workers of America, in reference to the then-pending strike, said:

" * * * Conscious of the great responsibility resting upon us, apprehensive of the danger threatening our commercial supremacy should the coal miners of the entire United States become participants in this struggle, we repeat our position to arbitrate all questions in dispute, and if our position is untenable, if our demands can not be sustained by facts and figures, we will again return to the mines, take up our tools of industry and await the day when we shall have a more righteous cause to claim the approval of the American people."

In an editorial published September, 1902, the American Federation of Labor declared: "We have pointed out that labor is invariably willing to submit its demands to impartial arbitration."

If a man of the type of John Mitchell were in control of the organization today, or if the spirit of his genius were influencing his successors, the anthracite region would not now be in idleness, and the consumers of anthracite would not be concerned as to their winter's supply of fuel.

In regard to the price of coal in which secondly the public is interested, the attitude of the operator is similar to that of any other merchant. Anthracite is in wide use as a domestic fuel, especially here in the East, and is deservedly a popular fuel, but it will only continue in popular use so long as in quality and reliability of service,

as well as in price, it is satisfying its customers. A third of its production is sold for steam use in direct competition with soft coal, and declining prices in these sizes have inevitably followed declining prices for bituminous steam coals.

The result has been that higher prices for domestic coal have been required than have been deemed reasonable by its customers, and that an increasing number of its domestic customers have been lured away to other fuels. The unquestioned convenience of gas and electricity, as well as the lowered prices of domestic bituminous and its by-products, based upon a materially lower wage scale in

Things operators are doing and have done to prevent public discomfort on account of the strike.

- 1 Offered to continue production at old wage scale until dispute was arbitrated.
- 2 Arbitration of all matters in dispute.
- 3 Proposed a five-year contract subject to annual wage adjustments, which, when operators and miners failed to agree, would be submitted to a commission of five persons selected by the presiding judge of United States Circuit Court of Appeals, to include an engineer, economist, judge, representative of labor, and representative of capital.
- 4 Advised their customers who have not laid in anthracite supplies to provide themselves with substitutes, even though it may mean permanent loss of their market to those substitutes.
- 5 Instructed their combustion engineers in cities where they are employed to lend their aid in educating customers in most efficient use of substitutes.
- 6 The industry is paying a wage scale fully 10 percent above highest war wage, and one which at present cost of living gives workers purchasing power nearly double that before the war.
- 7 They are unalterably opposed to an agreement to settle strikes which will add to the consumers' cost for coal. And unalterably opposed to the check off, because:
- 8 The anthracite industry finds itself in this position—

If it accedes to the demands of United Mine Workers, to bring about temporary peace, it signs its own death warrant, or, equally disastrous, places itself under complete domination of that organization. If it holds out against the "hold-up" it must of necessity sacrifice large part of its markets to competitive and substitute fuels.

What Would You Do If You Were Placed In Their Position?

settled to the satisfaction of the President of the United Mine Workers, or his policy of force in both industries has been superseded by a policy of negotiation and arbitration.

The anthracite industry, because of conditions forced upon it, is truly sailing between Scylla and Charybdis. If it accedes to the demands of the United Mine Workers in order to bring about a temporary peace it signs its own death warrant, or, almost equally disastrous, places itself under the complete domination of that organization. If on the other hand it holds out against the hold-up it must of necessity sacrifice a large part of its markets to competitive and

non-union fields, has had a serious effect in diluting the anthracite markets.

These are problems of which the operators are fully conscious and which should engage the serious attention of the mine worker, if steady work is to be continued. The industry can afford a high wage scale, but it can not afford a wage scale too far out of line with wages in other industries, or one which does not conform in some degree to prevailing standards and costs of living. The anthracite miners have been enjoying without a single step backward a wage scale 10 percent above the highest war wage and one which at the present cost of living gives them a purchasing power nearly double that before the war. The extent to which this can be maintained is problematical, but it certainly can be maintained longer if the Union would abandon its militant and restrictive policy for one of conciliation and cooperation, whereby constructive methods of increasing output per man and reducing labor costs can be put in operation. That competition is not a "bugbear" but a fact must be brought home to the mine worker. The operators are insisting upon these practices, not only for their own salvation, but in the interest of the public.

In conclusion, it may be well to repeat and to emphasize the position that the anthracite operators have taken in regard to three cardinal points in the present controversy:

1. Determined opposition to the provisions in any agreement that would add to the cost of their product.
2. Determined opposition to the adoption in the anthracite industry of the restrictive policies of the union, one of which is exemplified in the demand for the "check-off."
3. Determined intention that any agreement which may be entered into shall contain a provision for continuous operation of the mines at the termination of a contract period pending the conclusion of a new working arrangement in order that the public may be assured of a dependable supply of fuel, at least until all the avenues of negotiation, conciliation and arbitration have been tried out and exhausted.

In all of these the operators believe that the interests of the public more than those of the industry will be subserved.

A CORRECTION

In crediting an article in the November issue on the Future Prospects of the Gold Mining Industry, the title of Mr. Arthur B. Foote, general manager of the North Star Mines, was erroneously given as president.

STABILITY OF OPERATION AND EMPLOYMENT IN COAL

(Continued from page 589)

hope to possess. If established by the industry itself, such an inside commission would instantly command the confidence of the public, as an expression of good faith on the part of the industry to begin with. I earnestly urge both operators and miners to consider seriously some such means—the only means available, as I see it—for overcoming the first evil of over-development.

Among other factors necessary to stability of operation and employment I regard as important a broadening of railroad policy in the purchase of fuel. If each railroad bought its coal of mines along its own lines, and paid a price that would insure a reasonable profit, and bought at such season as to insure more regular operation, another great evil of the coal industry would disappear. As now, some railroads bargain for their coal on the lowest price offered, by mines often remote from their systems. The consequence is that operators on their own lines frequently furnish railroad fuel at a loss. The communities about these mines are impoverished, general freight and passenger business is curtailed by this custom of buying coal mined in fields away from their own roads and the railroad itself is thus the sufferer by its own fueling policy.

It would seem to me good business for every road, where possible, to buy its coal from mines on its own lines and at a fair price to all concerned. I believe that the reciprocal business developed by profitable patronage would more than compensate for any apparent increases in price paid for such local coal. From the findings and recommendations of a joint fact finding commission there would no doubt be developed a permanent mining clearing house, which would become a guiding authority on market conditions, storage records, competitive substitutes, freight rates, logical available markets for the product of different fields, and the many other factors contributing to the present uneconomic situation.

If a way is found to abolish these self-evident ills of the industry, as I feel sure can be done, if the spirit of real cooperation develops, the coal industry will lose its reputation as a chronic breeder of trouble and disruption to industry in general.

Let us ever keep in mind what the Good Book says—that salvation comes from within. Surely the coal mining industry can best adjust its own problems in its own way. Technically, and morally, this way seems to me the best for the industry itself, for the country, and for all concerned.

ECONOMICS BRANCH ESTABLISHED IN BUREAU OF MINES

ACTING on the recommendation of the advisory committee and Director Turner, of the Bureau of Mines, Secretary of Commerce Hoover has established an economics branch in the Bureau of Mines. Charles P. White, now chief of the Coal Division of the Commerce Department, was appointed in charge of this work.

This is the first step in the reorganization of the bureau, which, together with the Division of Mineral Statistics, was transferred last summer from the Department of the Interior to the Commerce Department. This new branch will embrace the Division of Mineral Statistics, and there will be transferred from the Bureau of Foreign and Domestic Commerce to the new branch the major work of that bureau on petroleum, coal, and other minerals.

The contemplated changes will be effective December 1 if reorganization plans can be completed by that date, or, in any event, not later than January 1. The scientific work of the Bureau of Mines will continue under the direction of D. A. Lyon, who will act as heretofore in the position of assistant director in charge of the technological work of the bureau.

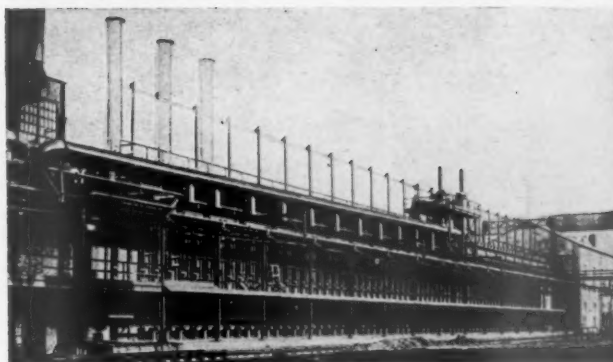
Mr. White, who heads this new branch, is originally from Ohio. He came into Government service as manager of Lake and Canadian distribution in charge of coal supplies for these northern communities under the United States Fuel Administrator during the war and later as Assistant Federal Fuel Distributor in charge of fueling of the Northwest following the strike of 1922.

His previous business career in industry covers years of operation of coal dock properties on the Great Lakes, of bituminous mines in Ohio and Pennsylvania, and in executive positions as vice-president and general manager of large coal corporations.

Sixty-two employes of the Colonial Coal and Coke Co., at Prestonsburg, Ky., have joined with the executives of that concern in an arrangement which provides protection for them as a group through an insurance policy issued by the Prudential Insurance Company of America.

Under the terms of this group policy, each employe who has more than one month of service will be protected for \$1,000. The premiums will be paid on the contributory plan, with the workers sharing in the cost of the protection.

The Colonial Company is engaged in the mining and shipping of coal.



81,538,373 short tons of coal were consumed in 1923 in the production of coke (not including gas house coke) at 257 plants in the United States. Coke produced in 1923 amounted to 56,977,534 short tons. Photograph shows battery of 70 coke ovens, Gary Plant, U. S. Steel Corp.



7,276,939 short tons of bituminous and 1,245,672 short tons of anthracite coal were consumed in the manufacture of gas at 939 plants in the United States in 1923. Photograph shows interior view of retort house, Philadelphia Gas Works, United Gas Improvement Co.

WHAT OF THE COAL INDUSTRY OF TOMORROW

Today's Development Projected by Cold Logic Into Twenty-Five Years Of Uncertainty—We Have Started Down A Path—Where Does It Lead?

By GEORGE H. CUSHING

IF WE could hurdle the next 25 years, what sort of a coal industry would we find? What kind of development will another quarter of a century bring?

As we look back over the last twenty-five years, it seems that there has been hardly no change at all; certainly, there has been no revolution. Men are thinking about as they did then; they are doing about the same things. Certainly, they are quarreling about as much. Have we a single valid reason—except our vernal hope—to expect anything, much, that is new or promising? There are answers for all of those questions, if we but seek them in the right places.

In individual coal fields, men see, at intervals, a curiously fascinating development which seems to breathe the law of industrial growth and decay. That is, a field grows quickly when it is young and new; it then progresses into a more sober and solid expansion; and, after a time, it begins to decay. The coal industry as a whole, and indeed the nation, seems to have passed through, in the last half century, that adolescent period of quick and rank growth. At the end of it, it has bulk, vigor and passion without, as yet, having fallen under the restraining influence of reason leading to poise. Much the same thing is true of the nation.

As we try to follow the overgrown and clumsy coal industry into its developing manhood, it need not be expected that we will see a tonnage expanding in obedience to the laws of geometrical progression. It may even be too much to expect that coal output will show, each year, a percentage increase compounded. If the developments of the

last seven years—since the World War passed beyond our horizon—are understood, they are eloquent of a new period; they are prophetic of a time when something will govern besides quantity production. Coal's future lies clearly in the direction taken when mere bulk ceases to be the magnet and when necessity forces toward refinements.

When any industry sets out to find where it is going, the safest course is first to inquire where it has started to go. It is reasonable, usually, to expect that it will end up where it started for. Therefore, in what direction has the coal industry started?

A mere mention of the outstanding events of the last quarter century will be sufficient. Before the dawn of the new century, Mr. Solvay, the Belgian, had set up his little plant on the edge of a field of salt in New York and had started to make soda ash by a new process. To do so, it was necessary for him to extract some by-products from coal. The ensuing twenty-five years saw the soda ash product sink into relative insignificance while the incidental coal distillation expanded into our by-product coke industry.

At about the same time, the leading English universities had sent some of their scientists to the United States to lecture on the making of the, then, new discovery of water gas. The ensuing twenty-five years has been devoted to the translation of the coal into gas; the gas into power; and, recently, the gas into liquid—an entire scientific departure of sweeping possibilities.

At about the same time, the vigorous men of America were developing the

internal combustion engine operated by a product extracted from petroleum. The ensuing quarter of a century has been devoted to establishing a new kind of transportation. It has developed so rapidly that, as a people, we are looking uneasily toward the approaching exhaustion of our petroleum supplies and hopefully toward the liquid resultant of coal distillation.

Finally, at about the same pivotal moment in our history, some political leaders, zealous for a new social conception, were starting their movement to wrest the rail transportation lines from their lodgment in the hands of private individuals. Through twenty-five years there developed such a burden of transportation charges the people turned readily to anything which promised relief.

Those four developments are coming to a focus just as we turn into the second quarter of a century. They mark the path which, for the next quarter of a century, the coal industry must travel. Everything which is most likely to happen must be a logical projection and extension of these beginnings. And, of these four, the keynote of coal's future is struck in those processes which retain, for man's use, all of the power in coal but which change its form and, by increasing its convenience, enhance its value.

To understand what is about to happen, we have to go back to simple beginnings which, while unimportant in themselves, set in motion the habits which proved determining. Coal's introduction into our economic life came through the household heating apparatus as a substitute for the vanishing supply of wood and through the forge



Coal enters into road construction to a vast extent. Tar, of which from 7 to 10 gallons are obtained from each ton of coal carbonized, is used widely as a top dressing. Cement is always brought to mind when the word "roads" is mentioned, and in 1923 8,444,609 short tons of coal were consumed in its manufacture



The automobiles of this country consumed 6,224,500,000 gallons of gasoline in 1924. To obtain the same amount of motor fuel through the distillation of coal in by-product operations between two and two and one-half billion tons of coal would be required by the use of present methods. This process, however, would yield many other valuable by-products

of the blacksmith as an alternate for charcoal. The demand for a house heating fuel to replace wood called naturally for large pieces—chunks; large lumps of coal. Our customs and practices change so slowly that for nearly a half century we have demanded lumps of coal the size of a block of wood, when for a generation but few have ever burned wood. This pointed to the directions in which the coal operator must look for his profit—in the sale of lump coal. Meanwhile, the quick expansion of our business structure created an ever-increasing market for coal for power generation, which caused the demand for household coal to occupy a constantly contracting relation to the total output. Thus, the coal industry for twenty-five years had rested its hope of profit upon an obsolete size of coal and which was gradually decreasing—relatively, at least—in quantity. Indeed, today, it constitutes less than 12½ percent of the total. On the contrary, the slack coal—once a waste product and even now an unprofitable size—steadily grew in that importance which attaches to a dominant fraction, until it represents more than half the total production. This very inequality has been enhanced by the struggle to match falling market prices with decreased cost of production. That is, under constant pressure to meet keen competition, the coal operators had gone more and more to the use of mechanical devices of all sorts—those which produce and those which size the coal. And every new piece of machinery employed to cut costs served also to reduce the quantity of the large-sized coal which sold at profitable figures and to increase the quantity of slack, which still does not return its cost of production. This situation has now reached a climax; meaning that the operators can-

not sustain the position they have fallen into and must seek relief in another direction.

Almost every way the operator turned the values of the slack he was sacrificing was being demonstrated. Through the last twenty-five years, America has studied to get the most intensified utilization of the potentialities of its coal. Those who wanted to develop quickly the greatest amount of power from a given amount of coal learned they could do it if they reduced it to pulverized form and consumed it in an especially-designed furnace. To get pulverized coal, they bought slack for the simple reason that the slack coal was already reduced to a 40-mesh; the pulverized coal burner required a 200-mesh. It was far easier to crush a coal that was already crushed than to break down another. Therefore, those who wanted pulverized coal, bought the slack.

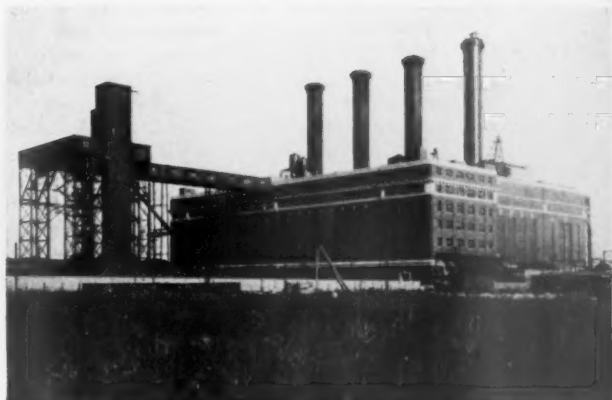
The operator had a far more graphic lesson. In the same twenty-five years, it became known that some of the greatest disasters came from the explosion of coal dust. At the end of the first quarter century, they were struggling to avoid these explosions. Thus, in the mine they were trying to prevent the coal from doing the very thing they wanted it to do in the power house—burn instantly. Dust explosions were a great object lesson.

The gasification of coal could best be done if first it was reduced to pulverized form. For that reason, the gas works also wanted the slack coal. The operator, at that point, had a concrete illustration of the value of his slack; the coal translated into gas sold at a handsome profit, whereas, the coal itself had sold at a loss. The same was true of electricity. It was produced from the slack coal and sold at a handsome

profit although the coal itself netted the operator a loss.

Thus, for a quarter of a century, every improved method of coal production increased extravagantly the yield of slack but the production grew faster than the market. Therefore, slack coal losses were preventing mine profits at the very moment when those who were making new processes available to the nation were doing it with this "waste" product of the mines. The salvation of the situation is that, at the beginning of this new quarter century, the operator is finally conscious of the source of his loss and of the fact that his sacrificed product has become the cornerstone of profit and expansion in the business enterprises which have shown a steadier profit record than any other class of industries. Therefore, as we start upon a new quarter century, some few operators give evidence of having understood their object lessons and display a disposition to undertake the conversion of their slack into those profitable products. Thus, out of the necessity of a trying commercial situation, there promises to develop the seeds of a new line of coal action and a source of reasonably sure profit.

The processing of his product which thus invites the operator to abandon his status of a quarryman only, is, as yet, in its infancy. Many of its major problems remain unsolved and, in fact, seem to grow daily. To indicate, it has been but little more than twenty-five years since coal distillation in this country produced only illuminating gas and a spongy kind of coke, which was too light for metallurgy and too porous for a domestic fuel. Such by-products as were extracted were crude and few in number, principally tar and ammoniacal liquor. With the introduction of the by-product retort, this situation changed



37,556,000 short tons of coal were consumed in generating electricity in the U. S. in 1924. While this represents an increase of only two and a half million tons over 1919, the operating efficiency of the generating plants improved from 3.2 lbs. of coal consumed per K. W. H. in 1919, to 2.2 in 1924. Photograph of Hell Gate Station, courtesy of the United Electric Light & Power Co., New York.



The domestic dye industry has grown to large proportions. The coal-tar industry is classified as a "key industry," for dyes, drugs, explosives are all made from its primary derivatives. In 1919 the production of coal-tar dyes amounted to more than 63,000,000 lbs. We are now producing more than 40 percent more of coal-tar dyes than were imported in 1914 or prior. Photograph taken in the Du Pont Dye Works.

gradually until the World War gave a tremendous stimulus to all branches of chemistry.

To indicate that the operator has a business chance in the direction in which he is looking, it is not necessary to catalog the products that are extractable from coal by distillation. Nor does it add anything to give the number now habitually taken from coal by our by-product plants. All of that information is found in any good almanac. It is indicative, however, to say that the business has grown to such sizable proportions that frequently a plant is in one city or state and has consumers in another. We are on the borderland of long-distance transmission even of artificial gas. As the business grows in this way and as the plants increase in size, it is becoming common for one great plant to supply a number of localities, each having its own separate and jealous governments. This makes difficult any such thing as uniformity of contracts. In the dealings with these various governments, the gas companies have found it necessary—against their wills, however—to distinguish between the production of the gas and the means for transporting and distributing it. In effect—a direct outcome of the delimiting of functions—the pipe lines have become mere common carriers. This is certainly true in those cases where the plants are in one state and the customers in another. This means, of course, that if some one wanted to produce gas, the pipe lines would be compelled to transport it.

Thus when the coal operator begins, finally, to contemplate the possibility of converting his own slack into artificial gas, he finds the recent developments of the whole gas industry have been such as to give him a ready-made opportunity. Thus, it is peculiarly advantageous to have the pipe lines considered as common carriers.

A free—if not, indeed, loose—translation of the present situation is: The distribution of gas, including the fixing of the price, falls under the broad classification of public utilities. The transportation of gas is an act of common carriage. But the production of gas is still a private business and cannot readily be made anything else. The first two divisions of the business are naturally monopolistic in their character. The last division cannot be monopolized.

The next development in the gasification of coal is of peculiar importance in view of what has just been said. A year, or slightly more, ago, some German chemists announced that, as a result of their study of "brown" coal, they had been able to convert carbon monoxide into wood alcohol by the employment of a catalytic action. This opened an entirely new field for study by the chemists. And, as their studies extended, some discoveries were made. It is hardly anticipating developments to say that it is now possible to convert, by catalytic action, any one of the artificial gases into methane. And, if that can be done, it becomes apparent that at a point in the process, the gas can be precipitated in the form of a liquid closely comparable to benzol. It is known that benzol is an excellent substitute for gasoline—better, in fact, than the gasoline itself.

This in turn, opens wide another entirely new field. Thus we seem to be in the enviable position of gaining one new view and of opening many new vistas. Thus, if the "production" of artificial gas shall, ultimately, be declared to be a public utility—it is a remote likelihood at best—and hence under the regulatory powers of the state or the local communities, the operators need not pass automatically under regulation. They can merely change the character of their product from gas to a liquid and find an eager market

among the owners of internal combustion engines.

In substantiation of that point and to confirm the probabilities, it is not necessary to go, to any depth, into the development, to date, of internal combustion engines. The subject is somewhat too familiar to justify any agony of effort to elucidate it. It is enough to say that the attention of the students of such engines is being turned in two closely related directions. The most important question now before the automotive industry, for example, is: "What kind of fuel, if used, will, on the grand average, yield the best results?" One tendency—since the supply of gasoline is not keeping pace with the demand—is toward the conversion of the heavier oils into gasoline by the vapor process. This is now easily possible, being one of the important developments of the last decade. While it is a chemical fact, it is true that the resulting fluid is relatively of rather low grade—deficient, that is, in thermal content. On the other hand, benzol is, roughly, 25 percent stronger than gasoline. If the two fluids are competitive, the benzol will always have the preference. Certainly a blending of the vapor gas and benzol would supply such a quantity of medium grade fluid that the automotive industry would be under no necessity to change its engine design because of the character of the available fluid.

Now that it is known that the slack coal can be easily gasified; that the gas can be, by catalytic action, liquified; and that the liquid can find a ready market among the users of internal combustion engines, it seems that the operator has one part of his future precisely mapped out for him. When this indicated future is contrasted with the present difficulties over the production and sale of slack coal, it seems inevitable that the coal business will develop nat-

urally into the processing of its own principal product.

In passing, and without going again through the same method of reasoning to arrive at an inevitable conclusion, it may be said that, almost point for point the same thing is true of the use of slack coal in the electrical industry. That is, in the cities, the distribution of electricity is declared to be a public utility subject to regulation. In so many cases there is no longer room for reasonable doubt, the power lines have been declared to be common carriers. But, the production of electricity has not been and is not likely to be declared a public utility enterprise.

This, instantly, opens another new field which is most alluring. In addition to the ordinary uses to which electricity has been put, it is now becoming obvious that the railways are sure to be electrified. That, now, seems inevitable. When that is done, the carriers must maintain for their own use tremendous power lines. But in the transfer of their own power plant—together with that of many others—from steam to electricity, it is inevitable that the railways will lose an enormous volume of freight business formerly supplied by the coal traffic. That is, the coal traffic, as it is now known, will disappear but the power will be transmitted by the electric power lines. The railroads have been the common carriers for coal. The railroads, when they shall be electrified, will become tremendous carriers—for their own use—of electricity. Since the electric power lines are now common carriers, there is a logical possibility that the railroads will carry, in their power lines, the electric power for other users—will become the common carriers of this electric power. As has been shown, electric power production is independent of the carriage of it. That relationship continuing, there is nothing in this situation to prevent the operator from turning his slack coal into electricity and of compelling the common carrier to transport it.

While up to this point, attention has been given to the gasification of coal and to its translation into electricity, it is understood that these are but the primary products which must result from any such a processing of the slack coal as is here broadly hinted at. That is, it is out of the question to suppose that all of the coal will continue to be converted either into gas—as a common practice—or into electricity. There are other products contained in the coal which are far too valuable for the community to allow them to be devoted to such relatively base uses. We are rapidly approaching the point where a varied industry will call out all the

latent possibilities of our most interesting coal pile.

It is known that one of the first products to be derived from coal distillation is tar. It is now obvious that, in road construction, the demand for one tar product is expanding daily. What is not quite so well known is that this demand is about matched by the use of tar in roofing. Also, as the supply of wood decreases, the demand for its preservation is growing, hence the use of creosote—a tar product—is constantly expanding. These uses can easily absorb a very large percentage of the tar product leaving its active principle—a minor percentage, quantitatively—available for the refinements of chemistry such as the extraction of medicines and dyes. Those highly scientific uses have been growing steadily since the World War. These enterprises may not provide a field into which the coal operator may venture; they may prove beyond his depth. But that they will afford an outlet for the products of his distillation plants is evident.

Taking a quick summary of what has been said: It seems wholly reasonable to assume that the coal industry has now learned that, from a profit standpoint, it is headed down a blind alley so long as it shall attempt to cling to its present form—a mere quarrying operation. Certainly, it is without hope of financial reward if it attempts to pay its expenses out of the sale of a size which is vanishing from use while it piles up losses on a size the supply of which constantly is growing and which, invariably, exceeds the demand. On that score, the turning point of the coal industry clearly has arrived. It can not go on, blundering toward bankruptcy. A change away from its present practices must come if only to avoid the ruin which seems inevitable.

The moment, however, the coal industry begins to branch out in either of the indicated directions, it finds itself fitting snugly into the heart of two competing sources of power and into two competing systems of transportation—gas on the one side and electricity on the other. Epitomizing the possibilities in the direction of gas, it is evident that the products of coal mines will continue to support the gas industry. Also, through the employment of catalytic action, the product of the gas plant will supply a determining part of the power for the internal combustion engine; the automotive industry. As coal goes into electricity, its future seems to be linked closely with the railroads which, in addition to being common carriers for commodities will, being electrified, become common carriers for electric power also. It is thus obvious that the coal industry will in future hold a place which is accurately described only by saying it will

be the heart of the future of two of the most important developments now before the nation in an industrial sense.

But it is also evident that without the indicated coal products, the whole chemical industry could not survive. And with that goes the proposition that without this development of coal, the nation could not expand into those industries which are immediately ahead of the chemical industry—particular reference being here made to dyes and allied products.

This all means that while coal has been, heretofore, vital to the nation as the source of its power, it will, tomorrow—and within a quarter of a century—become the very heart of the nation's whole economic system. This is the road that the coal industry has started to travel. The indicated goal is the one at which, in all reason, it should arrive. It has required 25 years of development to make clear the drift. It need not be expected that it will take another 25 years to translate the inevitable drift into action.

The seriousness of the menace of lung diseases contracted by miners as the result of breathing extremely fine dust particles is again emphasized by the Bureau of Mines. The most important of these lung diseases is silicosis, also known as miners' phthisis, or miners' consumption, caused by the breathing of rock dust, especially fine silica.

Silicosis is known to exist in a great part of the hard rock-mining districts of the world. It is found in many of the states of the United States and in New Zealand, Australia, South Africa, and Great Britain.

Silicosis is present in many of the mining districts of the United States. In one district the Bureau found that 433 miners out of 720 examined had silicosis. It also found that 432 out of 1,018 examined in another district were so affected.

The rate of development of silicosis depends upon the character of the dust, the amount breathed, length of exposure, past illness (especially tuberculosis), and physical fitness of the men.

The elimination of silicosis among miners depends on preventing the formation of dust by wet mining methods—wet drilling and wetting sides, roof and bottom, muck, and rock piles; the use of sprays and water blasts to lay the dust after blasting; good mechanical ventilation to replace dusty air with clean air; and physical examination of all miners before employment and periodically thereafter.

A report on the subject, Technical Paper 372, by Dr. R. R. Sayers, Chief Surgeon, may be obtained by addressing the Bureau of Mines, Department of Commerce, Washington, D. C.



Looking Toward Arlington Across the Potomac

© Ernest L. Crandall

*The silent organ loudest chants
The Master's requiem*



When Christmas Comes to the White House

© Ernest L. Crandall

"No gilded dome swells from the lowly roof to catch the morning or evening beam; but the love and gratitude of united America settles upon it in one eternal sunshine."

TAX DIVISION DEFENDS DISCOVERY DEPLETION

Attacks On Discovery Clause Met By Prompt Presentation Of Facts Justifying Its Retention In The Law—Repeal Of Capital Stock Tax And Stamp Tax Urged And Creation Of Special Commission To Settle And Compromise Old Tax Cases Recommended

THE Tax Division of the American Mining Congress has been speeding its preparations to meet the expected crisis that threatens the depletion and discovery provisions of the revenue law. Attacks on both depletion based on March 1, 1913, value and on discovery value were made during the closing sessions of the hearings before the Committee on Ways and Means. Further attacks are expected in a report to be made to the Senate by the Senate Committee on Investigation of the Bureau of Internal Revenue.

The attacks before the Committee on Ways and Means on discovery were met promptly by statements from the Tax Division and from members of the General Tax Committee of the American Mining Congress. Protest against revision of the present depletion and discovery provisions also were forwarded to the committee by A. G. Mackenzie for the Utah Chapter, American Mining Congress; M. B. Tomblin, for the Colorado Metal Mining Association; Robert I. Kerr, for the California Metal and Mineral Producers Association; J. D. Conover, for the Tri-State Zinc and Lead Ore Producers Association; M. D. Leehey, Seattle, Wash.; A. W. Strowger, Portland, Oreg.; W. N. Davis, Bartlesville, Okla.; Hon. Joe J. Manlove, Joplin, Mo.; Hon. Scott Leavitt, Great Falls, Mont.

Following these protests against repeal the Committee on Ways and Means decided to retain the discovery provision, but to amend it so as to limit allowances for discovery value to oil and gas producers in accordance with a recommendation of the Treasury Department. It had been contended by engineers employed by the Senate investigating committee that, although the revenue regulations prescribed 160 square acres as the area proved by a discovery well at the center of the tract, there were numerous instances where discovery value had been allowed on other oil and gas wells drilled within the same 160-acre square. Under certain conditions such overlapping discoveries were apparently allowable under the wording of the law, and the Treasury recommended an amendment defining the term "proven area" in the case of oil and gas wells, and limiting that area to a single discovery, which would be the first commercial well brought in.

The exact wording of the proposed amendment has not been agreed upon. It will not be made public, however, until the new tax bill is introduced in the

House and released for publication. It is not known whether or not the proposed amended provision will satisfy members of the Senate investigating committee.

The Tax Division of the American Mining Congress, in its statement to the chairman, Wm. R. Green, of the Committee on Ways and Means, contended that with the 50 percent-of-net-income limitation on discovery depletion in the present law there can be no abuse of this provision by the mining industry. It was pointed out that no past abuse of the provisions could be charged against the mining industry; but that, on the contrary, the unfair interpretation and application of the law had resulted in the disallowance of legitimate discoveries of new mines and new ore reserves.

The Tax Division then called attention to facts about discoveries of oil and gas wells, since this seemed to be the basis of the attacks. In this connection the following data was submitted:

Total wells drilled, 1913-1923.....	222,676
Total oil discovery claims allowed, 1913-1923	8,450
Percent of discoveries to wells drilled	3.5
Total dry holes, 1913-1923.....	60,000+
Percent of new discoveries to dry holes	14
Unprofitable wells of small production	65,000
Total dry holes and unprofitable wells	125,000
Percent of new discoveries to these	6.9
Total annual expenditure for present drilling operations	\$600,000,000+
Total annual loss in dry holes and unprofitable wells	\$200,000,000+
Total net loss on dry holes and unprofitable wells for period, 1913-1925	\$1,286,600,000

Mr. Paul Armitage, chairman of the General Tax Committee, is preparing a brief covering all phases of the metal-mining situation, and the vital need for the retention of the discovery provision. This brief will be supplemented by data furnished by the Tri-State Lead and Zinc Ore Producers Association, Miami, Okla.; the Utah Chapter, American Mining Congress, Salt Lake City, Utah, and other metal-mining associations; and also by the report of Mr. Fletcher Hamilton, mining engineer, to the Senate Commission on Gold and Silver Inquiry, on which Senator Tasker L. Oddie, of Nevada, served as chairman. This report and other data assembled by that commission furnishes convincing evidence of conditions prevailing in the western metal-mining industries, particularly gold and silver, which justify not only the retention of the discovery clause in the revenue law, but also special consideration in respect to freight rates and

other factors that contribute to existing conditions.

In defense of the discovery clause Wm. N. Davis, president of the Midcontinent Oil and Gas Association, submitted the following statement on behalf of the oil industry:

"Apparently the criticism of the so-called discovery depletion section is based entirely on the assumption that the allowance was given in the first instance only as a sort of subsidy or bonus to encourage the wildcatters, to stimulate activity, and the discovery of oil, which was badly needed in 1917 and 1918 for war purposes; but there was an economic reason for this allowance in addition to the one just outlined.

"This economic reason is found in the character of oil production. An oil well is no sooner completed than its rapid decline begins. The same is true of oil pools and of the total production of the United States. Maintenance of the necessary production of oil is secured only by drilling every year a vast number of wells. The following statement is justified by the closely uniform experience of past years: The sums of money involved have been greatly increased by the ever-increasing depth to which it is necessary to drill.

"The record for 1925 will show drilled in the United States to maintain production some 25,000 wells at a cost of from \$800,000,000 to perhaps more than \$1,000,000,000. Of this number between 25 and 30 percent will be dry holes. Another 5 to 10 percent will be so small as to be almost equivalent to dry holes, and another one-third of the whole number will have initial production of less than 25 barrels a day to the well. A large proportion of these will not return the investment with interest during their lifetime. Thus the profits from the producing branch of the oil industry must come from about one-third of the wells drilled.

"Obviously the oil producer, whether an individual or a corporation, must set aside from the income derived from profitable wells a reserve for replacement of the oil produced in an amount adequate to cover all of the contingencies of this hazardous and uncertain business. It would not be sufficient when producing cheap oil from a rich and prolific property to set aside for replacement no more than the cost of that oil. Such procedure, followed by the distribution in dividends of the remainder of the income, would lead (Continued on page 599)

CALIFORNIA MINING MEN WORK OUT BETTERMENT PROGRAM

Through Series Of Meetings Pertinent Problems Of Mineral Industry Are Thoroughly Discussed And Concrete Remedies Evolved—It Is Shown That Many Existing Laws Work A Hardship—Mounting Taxation Is Greatest Drawback

MINING men of California, through a series of regional conferences held throughout the state under the joint auspices of the mineral division of the California Development Association and the Department of Mines and Mining of the Sacramento Chamber of Commerce, have finally drafted a program of things which must be done if the great mineral industry of the West is to be adequately developed and is to prosper. These conferences emphatically brought out the need of governmental encouragement of mining, a fundamental industry of the Nation, particularly through the revision of existing laws affecting the industry.

These conferences were held as follows: Grass Valley, September 15; Stockton, October 9; Redding, October 13; Sacramento, November 2; San Diego, November 13. Mine operators, prospectors, industrial executives, and state and Federal officials having to do with mining participated in the discussions. Similar resolutions, calling attention to the ills of the industry and advocating remedies, were adopted at each conference.

SACRAMENTO CONFERENCE

By far the most important of these meetings was the Sacramento Valley Regional Mineral Conference, held Monday, November 2, at the Hotel Senator in the Capital City of California, for it summarized the three previous meetings and evolved a definite program of action, which was indorsed at the San Diego session.

Secretary James F. Callbreath, of the American Mining Congress, was present and took an active part in the deliberations. At the luncheon, attended by 70, he made the principal address of the conference, reviewing the work of the Congress in Washington in behalf of the mineral industry, and pointing out some of the menacing movements at the coming session of the national congress, which would work further hardships on mine operators. He also called attention to a movement under way to repeal the discovery depletion provision of the income tax law, and said a united fight against this action would be necessary. In regard to the United States Bureau of Mines he said:

By BERT F. HEWES,*

WORK OF BUREAU OF MINES

"This Bureau of Mines seemed to be a little unpopular, and I felt that the mining people did not feel kindly toward it. Recently we investigated its status and asked Mr. Hoover about his plans. He said: 'I want to find out exactly what the people of the United States want the Bureau of Mines to do, and I will do all in my power to help the mining industry.' Later Mr. Hoover appointed an advisory committee to work out the future of the bureau. It sent out a questionnaire to the mining leaders of the Nation, and nine-tenths of the replies indorsed the bureau as operating at present. The bureau has been rendering most substantial help in the mining sections. Some years ago these sections would have evinced no interest in the bureau. Today they are all in favor of the work of the bureau. In the Joplin district alone the work of the bureau brought about an increase of 5 percent in the saving of values from the ores. Besides furnishing the gold when it is most needed, California has furnished the Nation a real business man in Mr. Hoover, who is doing everything in his power to make the department a real service department."

Mr. Callbreath also praised the cooperative spirit shown by the mining men of California in facing their problems and dealing with them in a practical way. During the morning discussion on taxation of gold properties, Mr. Callbreath said:

CUT DOWN STATE TAXES

"What we need to do is to work out the question of taxation so as to show what real profits are. Our efforts, it seems to me, should be to see that only profits are taxed. A modern gold mine, which has spent from \$100,000 to \$500,000 in development work has a long way to go before it can show a profit, for to the development costs must be added those of operation. If at the end of the month you have produced \$50,000, that is not profit yet; you would have to have a similar production for 10 months before the stockholder begins to make a profit, if \$500,000 has been expended. It is right there we should take action to see that only the real profits are taxed. I see no reason why a mine making a substantial profit should evade

its share of the public support, but I do not think it just that a mine with a big investment involved should be compelled to pay taxes before it makes any real profit."

MANY OFFICIALS PRESENT

Charles W. Merrill, chairman of the state executive mineral committee of the development body, presided at the business sessions, while William F. Gormley, president of the Sacramento department, acted as toastmaster at the luncheon. Seventy-eight registered at the sessions.

Officials present included Maj. C. S. Ridley, secretary of the California Debris Commission; Byron O. Pickard, chief engineer of the Pacific Experiment Station of the United States Bureau of Mines at Berkeley; James M. Hill, district engineer, United States Bureau of Mines, San Francisco; Walter W. Bradley, deputy state mineralogist; W. S. Kingsbury, state surveyor general; E. A. Bailey, state flood control engineer; J. C. Bates, chief clerk San Francisco United States Mint; C. A. Logan, district engineer, State Mining Bureau, Sacramento; H. E. Dillinger, Placerville, and Harold C. Cloudman, Berkeley, state assemblymen; Drury Butler, Sacramento county surveyor; Robert I. Kerr, secretary California Metal & Mineral Producers Association; Walter B. Fawcett, Government Service Bureau, Sacramento; E. W. Florence, division manager, Pacific Gas & Electric Co., Sacramento; G. L. Fox, industrial engineer, and G. McM. Ross, mining chairman, Stockton Chamber of Commerce; C. S. Knight, industrial director, California Development Association; Harold J. McCurry, president, and S. J. Richard, secretary-manager, Sacramento Chamber of Commerce; Fred W. Nobs, governor, and W. W. Waggoner, hydraulic chairman, California Chapter, No. 1, A. M. C., Grass Valley; Charles Magill, of land department, Charles E. Spear, district agent, and G. J. Sielaff, geologist, Southern Pacific Co.; E. G. Reinert, coast representative, A. M. C., Los Angeles; James B. Rowray, general manager, Sacramento Northern Railroad; Charles Walton, industrial engineer, San Francisco Chamber of Commerce.

Practically all present participated at different times in the discussions, which were informal. Matters were not minced in discussing the ills of the mineral industry. Unfortunately, space does not

*Manager, Department of Mines and Mining, Sacramento Chamber of Commerce.

permit quoting from the discussions. The substance of the resolutions adopted, many of which were presented before the western division convention in Phoenix, Ariz., November 16-19, is as follows:

RESOLUTIONS ADOPTED

Exempting gold mines from the provisions of the Federal income tax in the best interests of the future welfare of the Nation.

Indorsing the campaign of the American Mining Congress to have repealed the Federal capital stock tax and the Federal stamp tax on stock certificates.

Advocating the removal of the \$1,000 bond now imposed on prospectors entering upon grazing homesteads.

Favoring the establishment of copper refineries and fabricating plants in California to utilize the state's vast copper deposits.

Indorsing the community subscription plan of financing the reopening of mines, as it inspires greater confidence in outside capital.

Advocating a revision of the present interpretations of the California corporate securities act or else the drafting of a simpler measure.

Assuring the state mineralogist of full support in enforcing the provisions of the new California high-grading act.

Approving the nonmetallic mineral surveys now being made by the State Mining Bureau and urging that California mineral products be always specified, price, quality, and service considered, within the state.

Requesting the State Mining Bureau to prepare a legislative bill to expand the bureau into a State Department of Mines and Mineral Resources, commending the Sacramento Chamber's mining department for initiating the movement, and asking the California Development Association to introduce and support such a measure.

Asking the State Mining Bureau to submit report showing needs for additional mineral surveys and approximate funds required.

Indorsing the definite program of the Sacramento Valley Regional Advisory Council for the future construction, maintenance, and improvement of highways in northern California.

Favoring the rehabilitation of hydraulic mining through the construction of hydraulic debris retaining dams by the Government, as provided by the Caminetti Act of 1893, and requesting the delay of further action on the exchange of the Folsom prison dam site on the American river for farm land until the California Debris Commission makes a report on available debris dam sites.

Advocating the repeal of the California foreign corporation tax, which handicaps the interesting of capital outside the state in mining development.

Urging the Department of the Interior and its bureaus to publish as quickly as possible important and long-delayed geological reports and folios covering leading mineral districts and areas in the interest of economy, as the reports become worthless if withheld too long.

A STATE-WIDE PROGRAM

The above resolutions constitute the state-wide program of activities in behalf of the mineral industry which is to be carried out by the mineral division of the California Development Association and its affiliated organizations. It marks the first unified effort to better the conditions of the mineral industry in California, and it is deserving of the united support of all interested in the industry, according to Chairman Merrill.

An intense desire of all interests concerned in the mineral industry to cooperate in working out the betterment program and in carrying it into execution was the predominating keynote of the conference. Especially marked was the full cooperation promised by the various Government officials present, marking a new era in the relations between the industry and the different Federal bureaus. Major Ridley, of the Debris Commission, assured all that the commission, composed of three United States Army engineers, desired to do everything in its power to bring about the resumption of hydraulic mining on a large scale. Not many years ago such cooperation was entirely lacking.

DEFENDS DISCOVERY DEPLETION

(Continued from page 597)

to bankruptcy or rapid liquidation of the business.

"It may be reasonably assumed that the cost of replacement will approximate the average cost of the discovery and development of a like amount of oil in the ground, and a producing company failing to make the necessary discoveries is frequently forced, in order to maintain its production, to purchase properties discovered by others. A replacement or depletion reserve must therefore be adequate to meet that contingency, and it was upon this ground that in 1918 Congress authorized the discovery value of a property to be the basis for depletion deductions.

"Congress should allow oil producers in computing taxable income the same deductions for replacement or depletion reserves that the hazards and irregularities of the business force them to make in the sound conduct of their affairs. They should not be required to pay taxes on income which is only apparent and which in the maintenance of a continuing business must be set aside to replace the oil then being reproduced."

The American Mining Congress was

represented at the hearings before the Committee on Ways and Means by McKinley W. Krieh, chief of the Tax Division, and Paul Armitage, chairman of the General Tax Committee, who presented briefs urging repeal of the capital stock tax, repeal of the stamp tax on stock certificates, elimination of the retroactive features of the provisions relating to corporate reorganizations, and creation of a special commission for adjustment of old tax cases that arose under the 1916, 1917, and 1918 laws and are still unsettled.

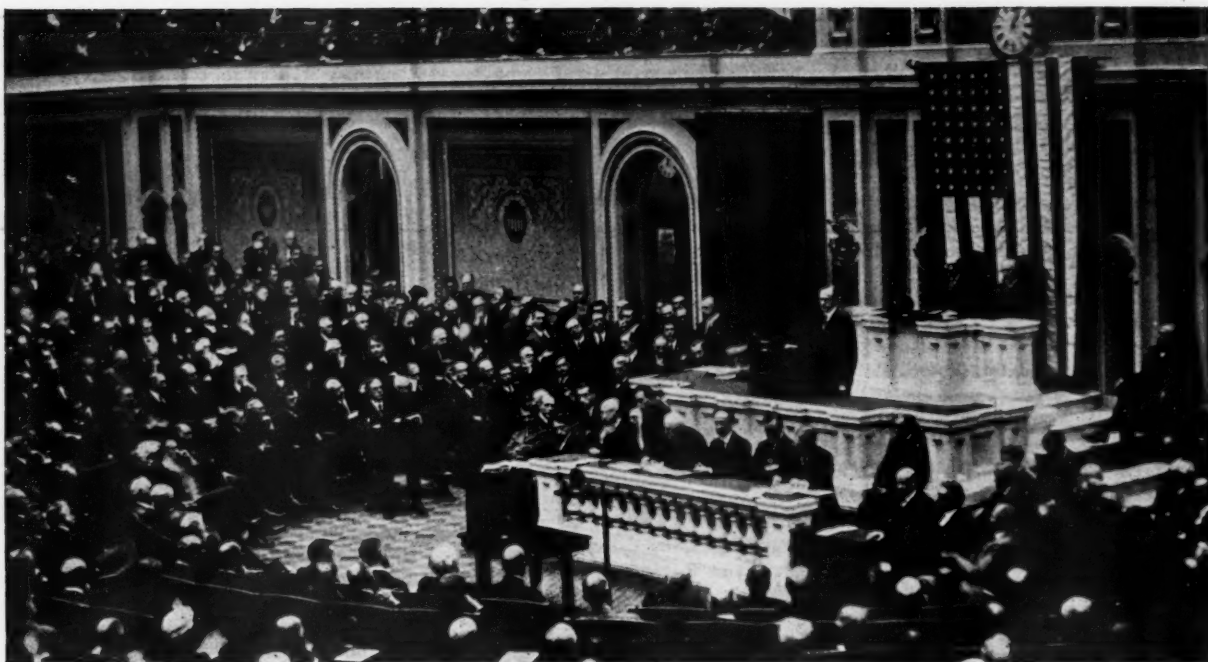
The Committee on Ways and Means has decided not to repeal either the capital stock tax or the stamp tax on original issues of stock certificates. Revision of the reorganization provisions is being considered. With respect to the recommendation that a special commission be created to settle old cases, the committee has tentatively decided to provide for this within the Bureau of Internal Revenue by creating a new office of general counsel in the place of the office of Solicitor of Internal Revenue, by creating six new deputy commissioners, and by giving the commissioner and his deputies broader powers of settlement and compromise than they now have.

The House committee also is expected to provide for the appointment of a special commission to study the administrative provisions of the revenue law with a view to securing their simplification. This commission would be composed of five Senators, five Representatives, and five tax experts to be selected. It would report to Congress in 1927. From this it would appear that few changes in the administrative provisions are contemplated at this time.

Delegates to the Twenty-eighth Annual Convention of the American Mining Congress will have an opportunity to discuss the provisions of the new revenue bill at the tax conference to be held December 9 and 10 in Washington. This conference will be attended by members of the General Tax Committee who are specialists in all phases of the Federal tax laws.

The House Ways and Means committee plans to recommend appointment of a committee of 15 to investigate and report in January, 1927, on simplification of the tax law and improvements in its administration. The President would name the committee which would consist of five Senators, five members of the House and five experts from Civil life.

The Mineral Division of the Department of Commerce and the Geological Survey have issued reports on the lead industry in North and South America, Oceania, Europe, Asia and Africa. They show that the United States leads in lead production and consumption.



The House Chamber—President Coolidge Addressing a Joint Session of Congress

LEGISLATIVE FORECAST

National Legislative Program Resumed—Wide Range Of Legislation Proposed—Program Of President And Leaders Limited In Scope—Tax Reduction, Government Reorganization, And Economy Keynotes—Mining Proposals Included In Prospective Legislation

CONGRESS is again in our midst. After a lull of nine months in legislative activity, the capitol again resounds to the tread of feet and pitch of voice of statesmen. The Senate and House will resume their accustomed tasks on Monday, December 7, when the first and regular session of the 69th Congress will open. They last met here in March, and the long lapse between sessions has given time for mature consideration of the new legislative program. To many members of both Houses who have had prior service in Congress the opening of the new session is much like that of previous gatherings, but to the several score of newcomers, the first day will be an innovation, with a touch of the melodramatic as they are inducted into the ways of official and legislative Washington.

A tentative program of major legislation for the session is being mapped out by the President and congressional leaders, and other subjects will be considered as time and circumstances develop. The outstanding piece of legislation will be revision of the Federal tax law and reduction of tax rates. This plan contemplates a cut of \$300,000,000 or more from the present tax levies, effective on 1925 tax returns. If no hitches develop in the legislative machin-

ery, congressional leaders hope to enact a new tax bill before March 15, the date on which income tax returns are filed. With this end in view the House Committee on Ways and Means, in which all revenue measures must originate, held hearings in October and November on



President Calvin Coolidge

proposals to reduce the Federal taxes. Secretary of the Treasury Mellon, Solicitor of Internal Revenue Gregg, and other officials of the department in charge of tax matters, and members of the Board of Tax Appeals, outlined the views of the Federal tax gatherers and pleas for reduction of tax rates were heard from representatives of taxpayers. Representations on behalf of the mining industry were made by the American Mining Congress, the principal plea being against a modification of the discovery depletion clause of the present law. The committee expects to report a new tax bill to the House early in the session and the leaders will cooperate to secure its passage by that body before the Christmas recess. The Senate Finance Committee is expected to expedite its consideration. The framing of the bill in the House committee has been marked by complete accord between the Republicans and Democrats. The main feature of the new bill is expected to provide for material reduction of the high surtax rates on corporations, the program calling for a reduction of from 40 to 20 percent in the maximum surtax rates. Consideration of the bill in the Senate may be marked by diverse views on tax questions as developed by Senator Couzens, Republican, of Michigan, who as head of

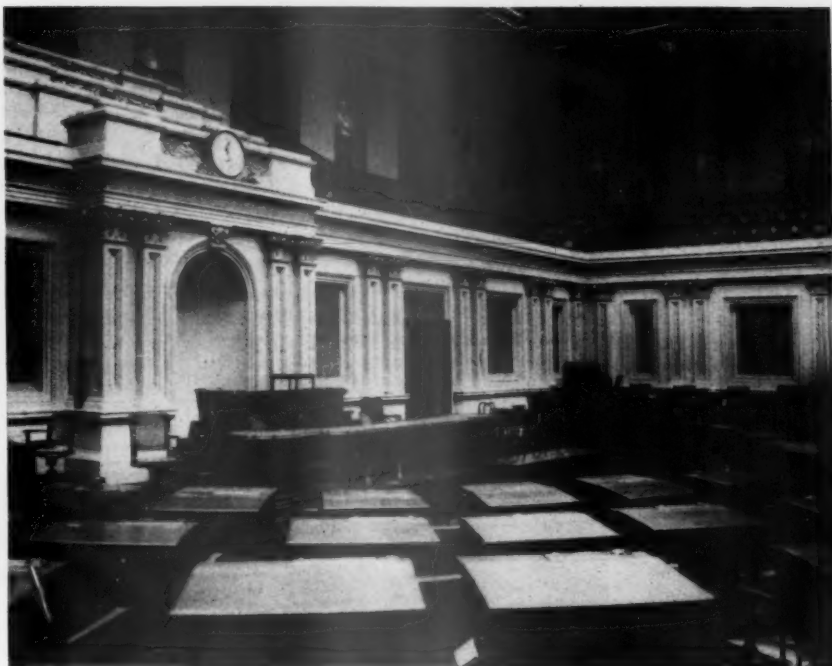
the special Senate committee which investigated the Internal Revenue Bureau, passed severe criticisms on various phases of tax administration. The report of this committee is expected to be laid before the Senate when it convenes, but it is predicted that it may not exercise a controlling influence in framing the new tax law, unless it is modified from the critical viewpoint entertained by the Michigan Senator during the investigation of the bureau and as based on transcripts of the testimony given out by the committee. This testimony sought to criticize copper and silver valuations; depletion deductions for mines and oil; amortization allowances, depreciation, and other provisions affecting natural resources.

PRESIDENT'S PROGRAM

Senate and House leaders hope the forthcoming session may not be prolonged beyond June. They feel that with speed Congress may wind up its pro-



Nicholas Longworth, Speaker of the House



The Senate Chamber. A Rule of the Senate Forbids a Photograph of That Body in Session

gram by that time. President Coolidge will give Congress his views as to what legislation it should attempt to enact when he sends his annual message to that body immediately after it convenes. His message will cover a variety of questions, both national and international, and will chart the course for the new Congress. The President will outline the tax program and his views on continuing the exercise of economy in Government expenditures. Reorganization of the Government departments with a view of making them more efficient at less expense will also be stressed by the Executive. Congressional leaders will give to the President their undivided cooperation in carrying out his recommendations.

As is customary upon the reconvening of a new Congress, a flood of bills will be thrown into the legislative hopper. These will embrace a wide range of subjects and propose both the possible and the impossible. It will be the task of the various committees of the House and Senate to thresh the wheat from the chaff and to discard to the proverbial dusty pigeonholes those measures which on their face do not warrant serious consideration. In the grist of measures will be many "hold-over" bills, as it is the practice of various Congressmen to reintroduce their bills at a succeeding Congress if they fail in a previous Congress.

Second in importance to tax legislation will be consideration by Congress of the regular appropriation bills for the support of the Government and its many

activities during the year beginning July 1 next. In view of the pronounced economy program of the President and the Budget Bureau, Congress will carefully scan, both in committee and on the floor of the House and Senate, every item for the expenditure of public funds. The pruning knife will be vigorously applied to every account and it will be a case of the "survival of the fittest." Coupled with the economy-in-expenditure program will be an attempt to weed out or curtail un-

necessary governmental activities, or over-lapping Government functions and bureaus. Attempt will also be made to wean from the states some of the Federal aid projects, on the theory that this will contribute to economy in state expenditures. A strong effort will be made to put through a Government reorganization program. In the last Congress a comprehensive bill to reorganize the Government departments was proposed, but it failed to pass because



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Charles G. Dawes, President of the Senate

it created a new Federal department and made other changes which were not satisfactory to the bureaus affected. The new plan to be proposed is to authorize the President to reorganize and rearrange the Government bureaus and departments looking to increased efficiency and reduced expenditure for their maintenance. An attack on various independent boards and commissions who are not under Cabinet jurisdiction of any Federal department may also be launched.

MINING LEGISLATION

Matters affecting the mining industry are also expected to command the consideration of Congress. Congressmen who believe that the mining industry should be recognized by a Federal Department of Mines with a Cabinet officer at its head will renew their efforts to have such a new department created. Among those who will introduce a bill to this effect is Senator Oddie, Republican, of Nevada, chairman of the Senate Mines and Mining Committee. He will have the support of other Western Senators. Indications, however, do not point to Congress creating this department. In the first place, there is a decided aversion to the creation of new Federal departments, with their consequent added expense. Another factor operating against success for a Department of Mines bill is the fact that the old reorganization bill did not contemplate such a department, but proposed to transfer the Bureau of Mines from the Interior to the Commerce Department. This transfer has been accomplished during the congressional recess by Executive order of the President and the bureau is now functioning under Secretary of Commerce Hoover, with plans under way for a realignment of its policies and activities based on investigation by an advisory committee of mining men. Congress may therefore consider that this action disposes of the question, for the time being at least.

Western congressmen will endeavor to have Congress authorize the Treasury Department to purchase 14,000,000 ounces of silver at \$1 per ounce to complete purchases under the Pittman silver act of 1918. This bill passed the Senate in the last Congress but the legislative situation in the House did not permit of its consideration in that body. Senator Pittman, Democrat, of Nevada, author of the bill, is expected to reintroduce the measure, and members in both Senate and House will actively work for its passage. Representative Evans, Democrat, of Montana, will urge this legislation in the House.

Legislation in behalf of some war mineral producers whose claims were ruled out by the Interior Department under the former war mineral relief acts will be proposed. Senator Oddie has an-

nounced his intention of presenting a bill to authorize the payment of losses of producers who purchased or leased property in connection with war mineral production. Legislation may also be proposed to reimburse claimants for interest paid on borrowed money. Senator Phipps, Republican of Colorado, will also urge legislative relief for war mineral producers.

BLUE SKY RESTRICTION

So-called "Blue Sky" legislation, designed to regulate the issuance of securities, is likely to be reintroduced. Legis-



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Representative Tilson, Republican Floor Leader of the House

lation of this character has been proposed during the past few years but has met such determined opposition as to prevent its enactment. In the last Congress Representative Denison, Republican, Illinois, fathered a blue sky bill but when the House amended it beyond his intentions by including securities handled by all stock exchanges, he allowed the bill to die on the unfinished business calendar. This amendment was forced into the bill by Western representatives, who claimed it was unfair to apply the law to small exchanges and to allow the large exchanges to go scot free.

At this writing coal legislation does not appear to have a conspicuous place on the congressional or administrative program. While it is naturally to be expected that bills will be introduced to regulate the coal industry in view of the anthracite strike and the fuel shortage, drastic legislation is not anticipated. In the event of legislation Congress will have before it the reports of the Coal Commission of 1923, which have just appeared in printed form. Senator Oddie is expected to reintroduce his bill to

create a Bureau of Coal Economics to make a continuing study and reorganization of the methods of mining and distribution of coal with a view to stabilization of the industry. Senator Borah, Republican, Idaho, is also likely to propose coal regulation. Legislation will also likely be proposed by Congressmen from New England, including Representative Treadway, Republican, Massachusetts, who introduced a coal regulatory measure in the last Congress. Opponents of coal legislation will base their arguments on the ground that the anthracite industry is subject to state control; that coal mining is not interstate commerce, under Supreme Court decisions; and that Congress should not invade private industry and enterprise.

MINERAL DEVELOPMENT

Various proposals are likely to develop in connection with mineral land development. It is not expected, however, that a general revision of the mining laws will be attempted. Consideration of the present mining laws and their handicaps to mineral development has been given since March by a subcommittee of the Senate Committee on Public Lands. This committee heard miners and others in various Western states during the past several months and will make recommendations for changes in various processes of administration of the public domain. Changes will probably be proposed in the oil leasing law, the stock raising and homestead laws and the laws affecting development of mineral deposits. Legislation to develop sulphur and potash lands through leases will also be proposed. Mineral lands in the Northern Pacific Railroad land grant will be reported on by a congressional commission which has been investigating this grant.

Mining interests may be affected by proposed legislation to forbid the discharge of acid mine waters into streams. In the past various bills to forbid stream pollution by oil, and mine wastes, have been proposed, and in the last Congress a law was passed forbidding the discharge of oil into coastal navigable waters. The Army engineer corps is now preparing a report on pollution of streams by various substances, and will submit recommendations on the subject early in the session, in compliance with a direction of Congress.

The tariff is always a subject for congressional debate. The present tariff law was enacted in September, 1922, and has been regarded as generally satisfactory by the administration and congressional leaders. In the last session proposals were made for tariff duties on several commodities, including copper, but no action was taken as it was not desired to open up a general tariff discussion. Several prominent Democrats of the House have announced their inten-



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tion of proposing a general tariff revision after the tax revision measure is disposed of. Among these are Representatives Cordell Hull of Tennessee, and William A. Oldfield of Arkansas. Republican members of the House Ways and Means Committee, which would consider this legislation, are opposed to the movement, however. Attempt may also be made to revise the flexible tariff provisions and to change the administrative procedure of the Tariff Commission, whose administration of the law has not appeared to be satisfactory in the view of a large contingent of Congressmen.

COMMODITY DOLLAR

In the field of currency legislation it is expected that proposals will be revived to change the standard of value of the dollar to a value based on its purchasing power in terms of commodities. Heretofore this idea has not been given serious consideration and renewal of the plan is not likely to increase the popularity of the movement.

Water power development may come to the front in congressional debates, when the disposition of the Muscle Shoals, Ala., nitrate and power project comes before that body. A commission appointed by the President has been considering this subject during the last few months and has reported to the President as to methods of properly utilizing this plant. The President is expected to submit the matter for consideration of Congress. This subject was debated during the last Congress, a bill passing the House and Senate, but the legislation failed in the closing days of the session due to inability of the Senate to

agree to the final terms of the legislation.

TRANSPORTATION BILLS

Repeal of the Hoch-Smith law which requires a general reorganization of the general freight rate structure is to be sought in Congress. Many organizations, including the American Mining Congress, have gone on record against this legislation, and the movement to repeal the law is expected to gain momentum in the new session. Congress is also expected to pass on proposals to consolidate railroads into larger systems in order to give more efficient service at reasonable rates. Operation of the merchant marine will also come in for consideration and some action is expected in connection with the Shipping Board. H. G. Dalton of the iron ore and coal firm of Pickands-Mather Co., of Cleveland, investigated and reported on the friction between the Shipping Board and Emergency Fleet Corporation at the request of the President with a view of evolving a plan of more harmonious ad-



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Tax Framers. Above, Left, Representative Green, Chairman House Ways and Means Committee; Right, Senator Smoot, Chairman Senate Finance Committee. Below, Senator Simmons and Representative Garner, Democratic Leaders in Tax Committees

ministration of the law and development of American shipping.

LABOR LEGISLATION

In the field of labor legislation, an attempt may be made to secure enactment of an anti-strike law, in view of the anthracite strike. Organized labor will attempt to secure legislation to forbid court injunctions against strikes, and to abolish the Railroad Labor Board, replacing it with boards of mediation for adjustment of labor disputes.

Additional legislation to strengthen the present immigration restriction law to exclude undesirable aliens will probably be proposed by the House Immigration Committee.

OIL PRICES

The Senate will be ready to commence



Underwood & Underwood

business immediately after it convenes on December 7. It has before it as unfinished business, coming over from the extra session of the Senate last March, a resolution by Senator Trammell, Democrat, of Florida, for an investigation of oil prices by the Federal Trade Commission. The President may report to Congress on the oil industry, on the basis of a report to be submitted to him by the Federal Oil Conservation Board which has been investigating the oil industry during the past several months.

The House will take up for early action the appropriation bills for the support of the Government during the year beginning July 1 next. Its Committee on Appropriations began consideration of these bills on November 17, first taking up the bill carrying funds for the Treasury and Post Office Departments. On November 23 the committee took up the Interior bill, and following this measure the committee considered the Army and Navy and other appropriation measures.

SENATE ALREADY ORGANIZED FOR BUSINESS

The Senate is already organized for the business of the session, having selected its officers and committees at the brief extra session held last March to confirm the new Cabinet after President Coolidge was inaugurated. Vice President Charles G. Dawes, of Chicago, the noted banker and business man, who was the first Director of the Budget, and the author of the Dawes plan for war reparation payments by Germany, will preside over the deliberations of the Senate. He will not, under the rules, participate

in debate, serve on committees or vote, except in case of a tie ballot. The Vice President may precipitate a debate over the Senate rules during the coming session as he believes the business of that body is slowed down by the present method of procedure. Among his suggestions for reform is a limitation on debate, but Senators contend that unlimited debate affords a means of defeating or perfecting unwise legislation, and are loath to surrender their prerogatives on this score.

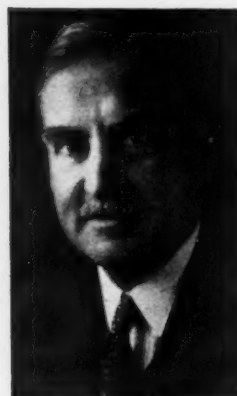
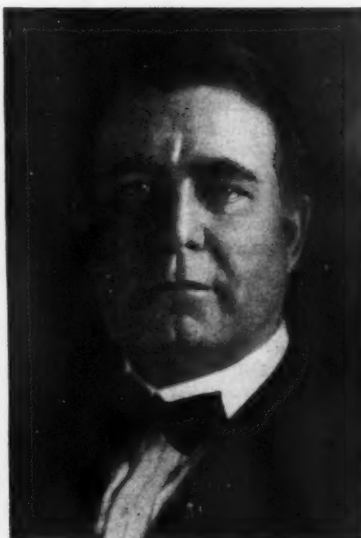
Senator Charles Curtis of Kansas is the Republican leader of the Senate and will be relied on by President Coolidge to carry out the administration's program in that body. He has able lieutenants in Senator James E. Watson of Indiana, the Republican whip, and the steering committee of the Senate, consisting of Senators James W. Wadsworth, Jr., of New York; William B. McKinley of Illinois; George Wharton Pepper of Pennsylvania; Frank B. Willis of Ohio; Frank R. Gooding of Idaho; Peter Norbeck of South Dakota, and William M. Butler of Massachusetts. Party leadership in the Senate has recently been harassed by insurgent obstructionist tactics, but with the passing of the progressive leader, "Bob" La Follette, and his cohort, E. F. Ladd, by death, since the last session, no great interference from this source is anticipated at the coming session. The Republicans in the Senate will have 55 members as against 39 Democrats, which gives them a good working majority.

SENATE COMMITTEES

The membership of the Senate Committee on mines and mining is as follows:

Oddie and Pittman of Nevada; Cameron and Ashurst of Arizona; Means of Colorado; du Pont of Delaware; Goff of W. Va.; Walsh of Montana; King of Utah; and Frazier of N. Dak.

The Chairmen of the other Senate Committees which will handle mining or related subjects are: *Agriculture*—Norris of Nebraska; *Appropriations*—Warren of Wyoming; *Banking and Currency*—McLean of Connecticut; *Claims*—Means of Colorado; *Commerce*—Jones of Washington; *Education and Labor*—Phipps of Colorado; *Finance*—Smoot of Utah; *Foreign Relations*—Borah of Idaho; *Immigration*—Johnson of California; *Indian Affairs*—Harrell of Okla-



Leaders in Coal Debate. Above, Senator Borah. Below, Senator Reed, Penna.; Representative Treadway; Senator Pepper

homa; *Interstate Commerce*—Watson of Indiana; *Irrigation*—McNary of Oregon; *Judiciary*—Cummins of Iowa; *Manufactures*—McKinley of Illinois; *Military Affairs*—Wadsworth of New York; *Naval Affairs*—Hale of Maine; *Patents*—Ernst of Kentucky; *Postoffices*—Moses of New Hampshire; *Public Buildings*—Fernald of Maine; *Public Lands*—Stanfield of Oregon; *Rules*—Curtis of Kansas; *Territories*—Willis of Ohio.

ORDER OF BUSINESS IN HOUSE

In the House the first order of business will be the election of the Speaker and appointment of committees. Representative Nicholas Longworth, Republican of Ohio, will be elected Speaker, having been chosen by the party caucus before the close of the last session. Representative John Q. Tilson of Connecticut will be the Republican floor leader. The House Steering Committee which will have charge of the legislative program will consist, in addition to Representatives Longworth and Tilson, of the

following: Representatives Geo. P. Darrow of Pennsylvania; E. E. Dennison of Illinois; W. W. Magee of New York; J. N. Tincher of Kansas; N. J. Sinnott of Oregon; and L. J. Dickinson of Iowa.

There will be five or more new members of the House Committee on Mines and Mining, to replace Representatives who have retired from Congress. Representative Robison of Kentucky has been chairman of the committee, but it is reported that he may transfer to another chairmanship. In that event the chairmanship would go to Representative Williamson of South Dakota. It is expected that the following members will be retained on the committee: Colton of Utah; Winter of Wyoming; Sproul of Kansas; Leavitt of Montana; Brumm of Pennsylvania; Manlove of Missouri; Sutherland of Alaska; Greenwood of Indiana, and Underwood of Ohio. Vacancies caused by the retirement from Congress of Representatives MacLafferty of

California; Favrot of Louisiana; Cummings of Pennsylvania; Lilly of West Virginia, and Richards of Nevada will be filled by the appointment of new men.

HOUSE COMMITTEES

The personnel of the House committees will be selected by a Committee on Committees, consisting of one Republican member from each state which has a Republican in the House. Their choice must be ratified by the House. It is expected that the following will be chairmen of the principal House committees: *Agriculture*—Haugen of Iowa; *Appropriations*—Madden of Illinois; *Banking and Currency*—McFadden of Pennsylvania; *Claims*—Keller of Minnesota; *Coinage, Weights and Measures*—Vestal of Indiana; *Foreign Affairs*—Porter of Pennsylvania; *Immigration*—Johnson of Washington; *Indian Affairs*—Johnson of South Dakota; *Leavitt of Montana*, or Garber of Oklahoma; *Interstate Commerce*—Parker of New York; *Irrigation*—Smith of Idaho; *Judiciary*—Graham of Pennsylvania; *Labor*—Beck of Wisconsin, or Fell of Connecticut; *Merchant Marine*—Scott of Michigan, or White of Maine; *Military Affairs*—Morin of Pennsylvania; *Naval Affairs*—Butler of Pennsylvania; *Patents*—Lampert of Wisconsin; *Postoffices*—Griest of Pennsylvania; *Public Buildings*—Langley of Kentucky, or Elliott of Indiana; *Public Lands*—Sinnott of Oregon; *Rivers*

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Silver Bill Advocates. Senators Pittman, Oddie, and McLean

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and Harbors—Dempsey of New York; Roads—Dowell of Iowa; Rules—Snell of New York; Territories—Curry of California; War Claims—Strong of Kansas; Ways and Means—Green of Iowa.

DEAN OF SENATE

The dean of the Senate will be Senator Francis E. Warren of Wyoming, who has been a Senator since March 4, 1895, or more than 30 years. The next Senator in length of service is Senator F. M. Simmons of North Carolina, who has been in the Senate since March 4, 1901, or 24 years. Other veteran Senators are Overman of North Carolina and Smoot of Utah, whose service dates back to 1903; Borah of Idaho, 1907; Cummins of Iowa, 1908; Fletcher of Florida, Jones of Washington, and Smith of South Carolina, 1909; Swanson of Virginia, 1910; McLean of Connecticut and Reed of Missouri, 1911; and Ashurst of Arizona, 1912.

The House dean will be Representative Henry Allen Cooper of Wisconsin, who has been a member for 30 years. Other veteran House members with their length of service are: Butler of Pennsylvania, 28 years; Haugen of Iowa, 26 years; Pou of North Carolina, 24 years; Garner of Texas, 22 years. The following members have served 20 years in the House: Bell and Lee of Georgia; Garrett of Tennessee; Madden, Fuller and Rainey of Illinois; and Burton and Longworth of Ohio.

NEW MEMBERS

There will be many new faces in both the Senate and House, due to election results, retirement and death. In the Senate the new members are: du Pont

of Delaware; Deneen of Illinois; Robinson of Indiana; Sackett of Kentucky; Gillett of Massachusetts; Schall of Minnesota; Williams of Missouri; Bratton of New Mexico; Nye of North Dakota; Pine of Oklahoma; Blease of South Carolina, McMaster of South Dakota; Tyson of Tennessee; Goff of West Virginia; and LaFollette of Wisconsin.

In the House there will be 78 new members. The political lineup gives the Republicans a good majority to carry out the administration program. The



Representative McFadden, Chairman House Banking and Currency Committee

Republicans outnumber the Democrats 245 to 183.

VIEWS UPON LEGISLATION BY MEMBERS

Representative John M. Evans (Dem.), Montana, favors passage by Congress of a bill directing the Treasury Department to purchase 14,000,000 ounces of silver at \$1 per ounce, to complete purchases under the Pittman Act. Mr. Evans believes the bill will pass Congress.

"The bill for the purchase of this silver was passed by the Senate in the last Congress, but it did not come to a vote in the House, although it was reported by the Banking Committee," said Mr. Evans. "This act ought to, and, I think, will pass in the new Congress. It would encourage the silver industry of the West."

Discussing the new tax bill Representative Evans said:

"The tax question is not political and should be treated as a nonpartisan subject. The present maximum surtax should be reduced to 20%, and under no circumstances should it remain higher than 25%. The exemption allowed heads of families should be increased from \$2,500 to \$4,000 or \$5,000. These cuts in the tax rate would reduce the revenue about three hundred and fifty millions. The raising of the exemptions would eliminate a million and a half returns of people who pay only a small amount or no income tax, the cost of which probably equals the money received in taxes. The law should be changed so that no one not liable for a tax should be compelled to make a return, and particularly should it provide for a definite settlement with the taxpayer that he may know that two



Senator Underwood

Senator Brookhart

© Henry Miller
Senator Williams

Senator La Follette

Photos Harris & Ewing
Senator Robsion

RETIRING AND NEW SENATORS

or five years hence he will not be harassed by his Government."

WAR MINERAL RELIEF

As chairman of the Senate Mines and Mining Committee, Senator Oddie, Republican, Nevada, is expected to take a prominent and active position in behalf of legislation on the mining industry. The Senator is a champion of the mining industry and will propose several measures in its behalf. One of these will be for the creation of a Federal Department of Mines with a Secretary of Mines in the President's Cabinet. Senator Oddie believes the mining industry is entitled to Cabinet representation in the same way as agriculture is represented.

Senator Oddie will also seek legislation in behalf of war mineral producers. He will introduce a bill to provide for the payment of claims of such producers for losses in connection with the purchase or lease of property which was necessary in war mineral production.

Another measure to be sponsored by the Nevada Senator will seek to create a Federal Coal Economics Bureau designed to conduct investigations looking toward stabilization of the coal industry.

As chairman of the former Senate Gold and Silver Commission, Senator Oddie will aid in the passage of legislation for the purchase by the Government of 14,000,000 ounces of silver to complete purchases under the Pittman Act. The Senator will also favor mining and land legislation which may be recommended by the Subcommittee of the Public Lands Committee of the Senate. This committee, of which the Senator is a member, has been investigating public land and mining questions in Western hearings since the recess last March.

Representative James A. Frear, Republican, Wisconsin, is particularly interested in tax and farm legislation. He is making a careful study of the tax problems but does not care to reveal his views until the new tax bill is brought

before the House. In connection with farm matters, Mr. Frear said the exodus from the farm is such a serious matter as to call for its consideration by Congress. "In the last five years 75,000 people have left their farms," said Mr. Frear. "The trouble is that farmers sell in an open market in competition with the world, while they buy in a protected market. I do not look, however, for extensive tariff revision."

HOUSE LEADER'S VIEWS

When asked for his views on possible coal legislation, Mr. Frear said: "Anything the President may recommend for the protection or benefit of the consumer will most likely be favorably considered by Congress."

The burden of carrying through the legislative program of the House will fall upon the broad shoulders of Representative John Quillin Tilson, Republican floor leader. As such, Mr. Tilson will be called on to arrange the daily program of legislation and to handle delicate and difficult parliamentary situations. The floor leader must always be on the job and close the day with the perfunctory but necessary motion to adjourn. Mr. Tilson brings to his position a happy combination which portends for a harmonious session, devoid of party strife or factional dispute. He is a Southerner by birth, and has had an extensive political and military career. Mr. Tilson was born at Clearbranch, Tenn., April 5, 1866, and spent his early life on a farm. His education covered public and private schools, Yale College and Yale Law School. He has for many years practiced law in New Haven, his home town. He served in the Spanish War and on the Mexican border in 1916, and is an expert on Army ordnance. His legislative service dates back to 1904, when he became a member of the Connecticut House of Representatives, serving until 1908, being Speaker of the House in 1907. He has been in the Na-

tional House of Representatives for 14 years. Mr. Tilson is a popular member of the House by reason of his uniform courtesy and lack of bitter partisanship. He is modest upon assuming his leadership. "No man is big enough to handle the job of directing the House unaided and alone," said Mr. Tilson in his room adjoining the House Chamber and from which will issue the policies of the new session. "It requires the combined wisdom of the many bright men of the House. It will be my policy to utilize the brains and capacity of the House. I will endeavor to use each member and his ability in the kind of work to which he is best adapted and which he is willing to undertake. I hope that the session may not be unduly prolonged and that final adjournment may be had early in June. I hope that in that time we can pass the tax revision and appropriation bills and such other legislation as may seem best at the time. Conditions look propitious for a harmonious session. I see no signs of intense partisan bitterness on the part of the Democrats and no indication of any factionalism in the Republican party to mar the forthcoming work of the House.

"The program of legislation for the House as I see it contemplates a reduction in taxes as the first order of business. This means a reduction of the maximum surtax rates to about 20%; elimination of tax publicity and of the gift tax; the reduction or elimination of the inheritance tax and removal of some of the excise taxes.

"The program of economy which has been followed with such fine results during the last five years must be continued. The appropriation bills must not carry any extraordinary additional items.

"There may be some remedial or minor regulatory legislation necessary in the case of the railroads and the merchant marine, but no other major legislation is contemplated."

Representative Arentz, Republican, Nevada, sees in the new tax reduction bill an opportunity to increase mining development in the West. "As far as the opening up of new mining territory is concerned, the mining industry is at a low ebb," he said. "A reduction in taxes, however, will put Eastern money into natural resource production where it has not gone since the war. Heretofore capital has not been interested in mining development because the Government taxes took too great a part of the returns. There is a strong need for continued exploration. We want our mining industry to be perpetuating." Mr. Arentz said he does not contemplate presenting legislation for a general revision of the mining laws. He proposed such legislation when he was in Congress several years ago, at the request of mining engineers, but that proposal met with strong opposition from various quarters and was abandoned.

Legislation in behalf of additional safety in mines will be sought by Representative Robsion, Republican, Kentucky, chairman of the House Mines and Mining Committee. "We need some additional mine rescue stations to act as a check on the continuing disasters in mines," said Mr. Robsion. "It seems that in locating the existing stations the mining regions of Kentucky were entirely overlooked. There ought to be at least two mine rescue stations in Kentucky, one in the Terre Haute, Ind., district, and others in various important mining fields. Too many people are being killed in our mines. The Federal Government should do all within its power to protect human life."

Representative Davey, Democrat, of Ohio, will introduce a bill giving the President power for two years to reorganize the Government departments in a businesslike manner.

"Enactment of this bill will save for the overburdened taxpayers of the country at least \$500,000,000 a year," said Mr. Davey. "The President has plead

for economy in government, but his hands are tied by existing laws, regulations, customs and red tape. It would be easily possible to dispense with at least 100,000 unnecessary Government employees."

Senator George H. Moses, Republican, of New Hampshire, president pro tem of the Senate, who will preside over the Senate in the absence of Vice President Dawes, looks for a harmonious session and adjournment by next June. "The legislative program will include reform in the tax system, railroad legislation, agricultural relief and some form of adherence to the World Court," said Senator Moses. "With such a simple program from the President, we ought to dispose of it and get away early. I doubt if there will be any legislation on coal, as I do not see anything now to indicate it. In the case of the anthracite strike, that is a State matter and I do not see any opportunity or disposition for Federal intervention."

OIL SHALE

Numerous mining matters will occupy the attention of Senator Lawrence C. Phipps, Republican, Colorado. The Senator is anxious to have the oil-shale industry developed, to extend relief to war mineral producers and to aid in stabilizing the silver industry. He will continue his efforts to have Congress pass the bill directing the Treasury Department to purchase 14,000,000 ounces of silver to complete purchases under the Pittman Act at \$1 per ounce. He secured the passage of this bill by the Senate at the last session, but it failed

in the House. Senator Phipps is a firm believer in the possibilities of oil shale, of which there are extensive deposits in Colorado. He secured appropriations from Congress for the survey of oil-shale lands and for the establishment by the Bureau of Mines in Colorado of an experimental oil-shale plant. "The area of oil-shale lands in Colorado amounts to 900,000 acres," said Senator Phipps in discussing the subject. "The yield of oil per acre will average 75,000 barrels or a total of 67,500,000,000 barrels. Oil produced from shales has proved equal if not superior to petroleum from wells. The operation of shale mining will be comparatively simple, because the measures lie almost horizontally and are thick enough to furnish plenty of head room. The water courses have cut numerous canons, affording favorable places for mining operations."

Referring to the appropriation by Congress for survey of the oil-shale lands, Senator Phipps said: "It constitutes substantial recognition by Congress of an industry which is still in the experimental stage. The national legislature has evinced a real desire to be helpful."

A caution as to the misuse of flame safety lamps in coal mines and a warning against the dangers of using mixed lights in such mines are given by the U. S. Bureau of Mines. Tests show that when rightly made and rightly used the flame safety lamp is thoroughly reliable.

In Miners' Circular 29, by L. C. Hsley, electrical engineer, just issued, it is shown how explosions have been caused or misuse of by the abuse flame safety

lamps or by the use of open lights and safety lamps in the same mine. The circular has been published in the hope that it will create a better understanding of flame safety lamps, which in turn should result in the proper selection of lamps and more care in maintenance.

Copies may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.



FACTS ABOUT THE COAL INDUSTRY IN WEST VIRGINIA

Press And Public Have Overlooked Fact That West Virginia Operators Gave Unionism Ten-Year Trial, During Which Period Coal Fields Were 80 Percent Unionized—End Of Unionism In State Began With The "Mingo March" And Ended With "Jacksonville Agreement"

By JOSIAH KEELY*

THESE are current certain impressions of the bituminous coal industry of West Virginia which seem to baffle the power of plain English to make clear. Not that these impressions are so damning that one need wax controversial, but their reiteration in the press gives one the feeling that the thousands of dollars spent by Government fact finding commissions have yet to reach any very great usefulness.

Starting at the industrial end, there is still a rather persistent assumption that the coal operators of West Virginia have, with the aid of political machinery and private guards, successfully withstood unionism. The state has always been pointed out as the original enemy of collective bargaining, and as unwilling even to try what might be worked out in the way of industrial co-operation through contact with the United Mine Workers of America. Now, of the hundred million tons of coal and more which will be produced in 1925, it is true that not five percent of it will have been mined by closed shop union mines. But it is equally true that for the 10 years prior to 1922 the state was 80 percent organized by the United Mine Workers and they themselves claiming 85. That this was a forced condition does not matter so much, as we believe it will not be denied by either miners or operators that the closed shop has usually been forced wherever it has gained a foothold. However, in the northern part of the state they were practically invited in and given the "check-off" and all the other trimmings, while in the south all but one or two counties yielded to the overwhelming pressure of public opinion and to the magnitude of the movement.

Now, what the public and the press have generally lost sight of is this 10-year period of unionism in West Virginia. It seems that the public's first good look at West Virginia was in those early days when her coal first began to attract the notice of what is called "The Central Competitive Field" from whence a wave of organizers swept down on West Virginia. West Virginia then occupied somewhat the position of colony to these older union fields and suffered as colonies usually do from the old country. Possibly the words "conspiracy," "combination," "aid," and "understanding" may have been too harsh and specific to describe the status of the invad-

ers, but it is almost certain that the Union was becoming a luxury which Ohio, Indiana, Illinois and Western Pennsylvania would fain share with West Virginia. Anyway, it was during these labor troubles that "Cabin Creek," "Paint Creek," and "New River" got on the map as what George Ade might call "The land of the spree and the home of the crave," and it was such a delightful picture for newspaper purposes that it was considerably overdone. Also, as the wild spots of America were becoming extinct, it was necessary for national purposes to play up something to take the place of the Indians. Moreover, certain West Virginians wandering beyond the borders of the state took a childish delight in playing the role of Othello, telling of the dangers they had shared and perils in the imminent, deadly breach. The Mine Workers were not slow to turn this make-believe bad-land-of-Virginia into a real wilderness of violence, and when serious writers accepted it as real, and real West Virginians got mad about it, the situation was really too delicious for sport-loving America to forget it. We have probably protested too much. West Virginia today is doomed to be pictured from the same old negative, and we do not call attention to this 10-year period of unionism as a matter of pride, or vindication; but to understand the state up to date, it is necessary to include 1912 to 1922 as a period of unionism, petty strikes and unpunished crime, ending in the south by the "Mingo March" and in the north by the Jacksonville Agreement, not loving the union less but the reputation of the state more. The plain truth is that West Virginia unionism, being free from such artificial bolsters as "certificated miners," labor blocs and political subsidy simply died from over-feeding, and it is not too much to protest that we have had the union and given it a fair trial for 10 years and more.

What we shall speak of next is more or less true of the whole bituminous industry, but it is especially true of this state: In the minds of our economists there seems to be no distinction between "too many miners" and "too many mines." You see, these expressions used to mean the same thing. There are too many mines to operate economically, but, working under the American plan, there is little danger of there being too many miners. The fact is

that practically every mine is undermanned rather than overmanned. Every paper in the state is advertising for miners. It was just as true in union days, probably more so, because West Virginia is now working miners from every coal state in the Union. There are too many miners to this extent: If the number of mines were reduced to where their maximum output would just supply the demand, these mines would be manned by real miners, picked for their skill, character and industry; and the overflow of unfit and undesirable would set about becoming more fit and desirable. As it is at present, the mines are so far short of a force to produce maximum output from any given mine that every man has an artificial value out of all proportion. He works, lays off, or malingers and still holds his job. In union fields, if he is discharged, there is likely a strike. In the non-union fields, a moving van is on hand at once from an adjoining mine where they need men. One of the most hopeless signs of the public ever understanding the situation is this apparent inability to analyze the difference between "too many mines" and "too many miners." A sufficient number of miners would have solved many mining problems long ago. The question, "Why is it that the coal industry is always having labor troubles?" can almost be answered by the statement that there are not enough miners; the supply of labor is not sufficient to man the too many mines. Henry Ford probably has a waiting list. If you are an employer of labor, ask yourself the question, "What would be the effect at my mines if there were a waiting list to be employed?" When a man begins to value his job on account of there being others willing and ready to take his place, the union itself, as in other fields of labor, confines itself to its legitimate function.

The cheapness, comparatively, of West Virginia coal is not due entirely, or even largely, to the cheapness of labor, but rather to the newness of the operations, the height of the seams, and their freedom from impurities. Of course, if there were really an overplus of miners, the tendency would be the same as any other oversupply. It seems only fair to make profits while a mine is new, as it must sooner or later go through its expensive period.

The mining hazard has always been played up, and is today in the anthracite strike, but, even counting in the great

*President, Cabin Creek Consolidated Coal Co.

explosions, 50 percent of all mine fatalities are due to falls of slate from negligence in posting, to say nothing of the haulage accidents caused by individual lack of discipline. Nearly all of this lack of discipline can be traced to the difficulty in obtaining anything approaching a waiting list of employees. Mine discipline depends entirely upon the ability of the boss to get another man when one quits or is displaced.

The thing, however, which makes the average operator more impatient of the lack of understanding of the public is their reluctance to accept his figures as to price and cost, but quite recently, though, a statement was given out through the press by the officials of the United Mine Workers which may be assumed to be, at least, unbiased. It was to the effect that coal, which was then selling at around \$1.50 per ton at the mine, was not bringing enough to pay the cost of production under the Jacksonville scale. This announcement was made as an argument for shutting down the nonunion mines, so that the price of coal would allow the mines to operate under union wages, but it gave an excellent opportunity for those who are interested in cost and price to get a basis for the information so long sought as something which was being withheld from the public. True, this was not the first time coal had sold below cost, and it will not be the last, nor was it much different from other instances when it was made to appear that "coal barons" were rolling up wealth at the expense of labor.

Although price is a point upon which anyone can satisfy himself at any time, cost is a factor that neither the operator nor the labor statistician can announce, only for the past. The only way a mine can approximate a uniform cost is to maintain a uniform output, from a uniform seam, under uniform weather conditions, at a uniform wage, with uniform markets for supplies, and a lot of other uniform things, and then the distances and the grades are changing every day. In a group of 20 mines there will probably be as much as 50 cents or a dollar difference between the costs at the highest and the lowest-cost mines. In 1924, I think I am safe in saying the cost of producing West Virginia coal on board railroad cars averaged around \$1.70 where the 1917 wage scale prevailed; 1925 should cost 10 or 15 cents less on account of the increased tonnage. This cost could still be reduced without decreasing wages if mines were put up to maximum tonnage. Tonnage is really everything when it comes to cost.

There has been much disagreement as to just what the difference in cost would be for a ton of coal produced under the 1917 scale, and the war scale attempted under the Jacksonville agreement, and it is really quite as open a question as,

"How long is a string?" Overhead may be defined as fixed costs, which go on whether coal is being produced or not. Most laymen think only of royalties, salaries, rents, taxes, and depreciation, but the necessary labor, outside of productive labor, is an overhead expense which multiplies enormously with an increase in wages. The difference in cost of a ton of coal, as between the two scales, may vary all the way from 45 cents to dollars, if the tonnage fluctuates, and it does.

While West Virginia stands ready to make capital out of the anthracite strike as simply one of the breaks of the game, it is not hard to believe that the anthracite operators are telling the truth as to their costs and profits and their ability, or inability, to increase costs. It seems impossible to get across either to the public or to the Government the necessity of making higher profits at one time than another. Mining work in general depends on spreading profit and loss over a period of years. Even the miner depends on "making a killing" one day to make up for the times he was "knocked out" some other day. The coal game does not seem intricate until you begin trying to explain it to others.

A number of books have been written, for propaganda purposes and otherwise, with the West Virginia coal fields as a setting. The writers come down and camp on the job to get all the color, and yet, when it comes to ordinary mining terms, we find them "sifting" the coal and describing the carbide light as a "safety lamp." It is no wonder that the public is completely dazed when it comes to discussing the prepared sizes of coal. In fact, when the price of coal is quoted in the market reports even the miners forget to look to see what kind of sizes are quoted and to figure what that would be on a mine-run basis. The miner is paid on a mine-run basis, the cost is calculated on a mine-run basis, and the price of prepared sizes is fixed with reference to how much you can screen out of a ton of mine run. Good Kanawha splint screens about half lump, a fourth egg, and one-fourth nut and slack. The soft, smokeless coals makes a much greater percent of the slack, so have to sell lump higher. The first requisite for getting the truth is to apply to those who know.

ALASKAN RAILROAD DEFICIT

THE deficit of the Alaska Railroad for the fiscal year of 1925 amounted to \$1,246,674.52, a decrease of \$489,901.89 over the previous year, according to the annual report of the general manager submitted to the Secretary of the Interior.

Total tons of commercial freight handled by the railroad in 1925 was 53,865,

a loss of 5,667 tons, or 9.7 percent due to decreased shipments of ore. Rail freight revenues during the fiscal year amounted to \$412,194, representing a decrease of \$20,980, or 4.8 percent. The total number of railroad passengers carried in 1925 were 48,300, a loss of 1,165, or 2.4 percent.

The decline in the operating receipts, the report points out, was more than offset by reduced maintenance costs and in economics effected in the general expenses of the road. The total pay roll in 1924 amounted to \$2,498,430.91. In 1925 it was \$2,051,026.75, a reduction of \$447,403.16, or 17.6 percent. The average number of employees in 1924 was 1,056 as compared with 981 in 1925.

The general manager in his report again called attention to the necessity of completing the railroad, the estimate of the cost being \$11,878,781. Expenditure of this amount over a period of years would provide such additional facilities and equipments as would be necessary for efficient and economical operation of the line. Decreased cost of operation and maintenance would also result, bringing a reduction in annual appropriations. The situation as it now exists with reference to maintenance and operation is one of economic waste due to the necessary hasty construction of the line. The work performed in repairing the line and putting it in shape after the frost has come out of the ground in the spring is not lasting, and the same work has to be again performed the following spring. This condition can only be relieved by placing the railroad in such physical condition that the damage sustained during the winter will be reduced.

The most important factors are the replacement of bridges supported on wooden piling with bridges supported on permanent masonry; the replacing of trestles, where necessary, with bridges or culverts, and the filling of trestles not necessary; the placing of sufficient ballast under the ties to eliminate the damage to the track now suffered by frost heaves during the winter months due to insufficient ballast; the widening of cuts and fills to decrease the cost of necessary maintenance work incident to narrow cuts and fills and to decrease the expense of removing slides and replacing the stuffing of the banks and fills; the riprapping of banks and the raising of the grade above normal high water to eliminate the constant temporary repairing due to floods.

Discussing the future of the Alaska Railroad, the report states that while no rapid development can be looked for soon, there are indications of a gradual increase in traffic, but there is no prospect that the operation of the railroad can be continued for some years to come without substantial appropriations.

OIL FIELD OR OIL SHALE FIELD WHICH?

Advancing Civilization Will Demand A Smokeless Fuel Of High Heat Value—Solution Lies In Use Of Oil In Which Shale Will Play Important Part Because Of Its Unlimited Deposits

By VICTOR C. ALDERSON

THE difference between an oil field and an oil shale field is one of completion. An oil field is a piece of work completed by natural forces; an oil shale field is incomplete; that is, in the case of the oil shale field natural forces have merely gathered, in the form of plant and animal remains, the constituents—carbon and hydrogen—of oil, but they have not completed the operation of making oil. In the case of the oil field natural forces have not only gathered the elements needed, but have also completed the operation by manufacturing the oil itself, gathered it under an impervious cap, and so arranged it as to be ready for discovery by the driller. Which is to be preferred? Clearly the oil field if it can be found, and if nature has made enough oil to meet the needs of mankind. The struggle is to find it. The search is beset with many difficulties, because underground oil is fickle and flighty.

THE GEOLOGICAL STATUS

The geology of an oil shale field is simplicity itself, so simple that it does not arouse more than casual interest. It consists merely of classifying the deposit, which is clearly exposed at the surface, in some geological horizon and giving it a name. The geology of an oil field, however, is a complex problem. The oil is concealed far below the surface; the dome or anticline can be determined only by a careful geological study of the district; this study is frequently hampered by a lack of outcrops and a thick overburden. Even when the structure is definitely determined the most that is really known is that the conditions for an oil pool exist. Whether nature has also provided the oil can be determined only by expensive drilling.

THE PRODUCT

In the case of the oil shale field the chemical character and constituents of each stratum can be determined by analysis. A retort can be devised to treat the shale most successfully. Inasmuch as the resulting oil is a manufactured product, experimental work can determine in what particular the product can be improved, standardized, and made to fit the market, to say nothing of the possibility of reducing costs to a minimum. All this is impossible in the case of an oil field. Whatever is the outcome of drilling—gas, saltwater, oil, or a dry hole—must be accepted as it is. No variation is possible. Even if oil is found it may be a highly desirable light

oil or a cheap heavy oil; it may be a gusher or only a pumper. The product as provided by nature is fixed; the oil man must accept it as he finds it and make the best of the situation, be it good or bad.

GUESS VS. CERTAINTY

When the geologist has completed his work the best that he can report is that he has determined a closed structure and that oil may be found at an approximate depth in a certain formation. The inference is a guess, considerably called a scientific guess based upon all available data, but a guess nevertheless. If the guess is a good one a pumper or a gusher results; otherwise all the time, labor, and money consumed are a total loss, except for the academic value of the information gained of the strata passed through. If oil is found, additional wells may have to be driven to secure full production before wells on adjacent land are drilled and the oil drawn away. In other words, there is a scramble for the oil before anyone else gets it; the maximum production results; a frantic effort to get cash for the oil regardless of the market. The result is that, on the average, within two years after the discovery of an important oil pool the peak of production is reached, 50 percent of the possible production is obtained, and decline sets in. The Los Angeles pools—Signal Hill, Huntington Beach and Santa Fe Springs—form a striking example of frantic, town-lot drilling, an excess production and a widespread disorganization of the entire oil market.

In the case of the oil shale field guess work is changed to exact knowledge. Besides the sampling of exposed strata, diamond drilling over an extended area, with the analysis of every stratum passed through, will give positive knowledge of the depth, thickness, and oil yield of each bed, as well as the location of faults, folds, or other irregularities not discernible at the surface. There are no dusters, no offset wells, no uncertainty. Thus an engineer's report on an oil shale field, condensed, of course, might be substantially as follows: (The figures used represent an actual field in Colorado); "The 5,000-acre tract examined shows, by diamond drilling, 12 commercial beds of shale of a total thickness of 154 feet, with an average yield of 24 gallons to the ton

and a yield of 185,050 barrels to the acre. After allowing a loss of 10 percent in mining, a net yield of 850,000,000 barrels of oil from the 5,000-acre field is assured." Such a report, based upon careful diamond drilling and exact chemical analyses, would form an excellent basis for determining the scale of operations to be undertaken, the daily output, the life of the property, and the scale of financing necessary.

ECONOMIC ASPECTS

Oil in a well, like ore in a mine, is a wasting asset, and, when once taken from the ground, can not be replaced. As mining towns have discovery, boom, and decadent periods, so do oil regions; when the ore or the oil is exhausted, the population moves away and the region is deserted. The fatal day may be postponed, but it is sure to come.

While there may be some technical differences in the refining and marketing of well oil and shale oil, there will be little or no economic difference. In the production of the oil itself, however, there will be the widest economic difference. The cost of geological investigation, wild-cat wells, and the drilling of producing wells must, of course, be considered, yet when the oil comes it is a finished product. The only expense then is for pipe-line construction and possibly pumping.

In the production of oil from shale many new factors enter because the project is essentially a manufacturing one in a new and unpopulated region, e. g., the collection of a large labor contingent; the creation of new towns and centers of population; the necessary houses, stores, business blocks, roads, streets, movies, water systems, and all the concomitants of modern town life. These improvements will all be of a permanent character because of the stable character and long life of the industry, as contrasted with the mushroom character of oil and mining centers. What has happened in Esthonia in the last few years is illuminating. There the oil shale industry was started in 1918 with an annual output of only 9,648 tons of shale; in 1924-25 this had increased to 240,000 tons. The Government plant now uses 21 locomotives, 600 dump cars and 2 distillation plants. The new community, built up about the plant, comprises 66 dwellings and 322 tenements. The payroll includes 25 chemists and engineers, 200 clerks and foremen, and 1,400 ordinary workmen. No oil well region, by comparison, can show such an

economic advantage, such an extensive employment of labor, such a widespread advantage to business and labor, nor such a valuable contribution to general prosperity.

PROSPECTING

The rapid depletion of an oil well requires constant and unremitting prospecting and drilling in the search for new wells to replace the decreasing supply from old wells. This is a heavy overhead expense, but one which must be borne by an oil company if it intends to stay in business. An oil pool is so far beneath the surface, its location so uncertain, its yield and life so problematical, that the best geological skill is none too good for an oil company to employ. At the present time geologists are doing their utmost to find new pools, but the record of production and their own admission in private shows that for the present at least they are not successful. There are no large oil pools in sight, yet in 1924 at least \$50,000,000 was spent in drilling dry holes, enough to build 50 oil shale plants that would have added largely to the economic wealth of the country.

The prospecting of an oil shale field is exceedingly simple and leaves no room for debate or argument. The details of surveying, drilling, and chemical analysis can be accurately done without recourse to high-priced experts, although there will be a demand for technical executives who have a broad comprehensive knowledge of the entire oil shale industry. The oil shale field is like a wide open book, easily read and clearly understood. On the one hand, an oil field is a gamble of the most pronounced type; on the other, an oil shale field represents a deposit of raw material about which every necessary fact can be determined to any degree of accuracy desired. One is a gamble, the other is a reasonable certainty.

THE FUTURE SUPPLY OF WELL OIL

There are no normal times in the oil business; all is abnormal. If the search for an oil pool is a gamble, the effort to estimate our future national supply of well oil is a still greater gamble. How much well oil still remains underground in the United States? This is the great question before us, as a nation. The answer varies according to the type to which the answerer belongs—the optimist, the pessimist, or the man of clear vision who examines all the facts, pro and con, and tries to express clear judgment. The man in the oil field who sees thousands of barrels of oil daily, whose entire environment is oily, can see no end to our national oil supply. The man who has paid for a mere hole in the ground or has lost money in oil stock speculation, or reads only of declining production can see nothing but

an oil famine before us. The wise man examines the subject from all angles and endeavors to draw a conclusion based on known facts, and not on beliefs, blind faith, hunches, or divining rods.

Three determined efforts have recently been made to answer this question. The joint committee of geologists of the U. S. G. S. and those in private practice estimated that the underground supply, recoverable by present-day practice, was 9,500,000,000 barrels and its life 20 years. This report has been generally accepted as the best possible estimate at the present time. The gravity of the matter then impelled President Coolidge to appoint a Federal Oil Conservation Board, taken from members of his Cabinet, to canvass the oil situation on the broadest possible lines. Their report has not yet been made. Meanwhile, a committee of 11 of the American Petroleum Institute, headed by J. Edgar Pew, has rendered a highly optimistic report to the effect that there remained in known oil fields 5,300,000,000 barrels of oil recoverable by flowage and present-day pumping; and that after this amount is taken out there will remain 26,000,000,000 gallons that may possibly be recovered by new processes; also that "probable" oil will be found in large areas not now productive.

At a recent meeting of petroleum geologists in Denver the Pew report was severely and almost unanimously criticized as combining a misinterpretation of facts and fallacious reasoning. C. A. Fisher, petroleum geologist of Denver, as well as other eminent geologists, criticized the report as too highly optimistic and offered the opinion that the present known supply would last only seven years. The opinion of those present was virtually unanimous that the effect of the report would be to build too high hopes of our future supply of well oil.

Earl Oliver, an oil man of Oklahoma, has filed a charge with President Coolidge saying, "A wide inquiry among well-known and recognizably well-informed students of the industry discloses an almost unanimous opinion that the report does not present a true picture."

Admiral Hilary P. Jones, U. S. N., a man of clear vision uninfluenced by any extremist, says: "There are too many who comfort themselves with the thought that there is an adequate ground reserve of petroleum in the United States to take care of our needs as far into the future as we need to look, but this has no evidence of being based on anything more than a mere guess and that guess is contrary to all scientific investigation." In the face of such adverse and

weighty criticism by those entitled to judge, it seems best to rely only upon the estimate of oil now remaining in known fields.

A brief survey of statistics of recent oil production will be illuminating. The well oil production in 1924 in the United States was 713,940,000 barrels; this was 70.5 percent of the entire world production and still was not sufficient to meet our demand by 33,576,000 barrels which were imported. In spite of the export of oil products the United States uses more oil than all the rest of the world combined. To meet our enormous demand there should be in sight new large producing oil fields; but they are not in sight. The daily peak of production thus far in 1925 was reached in the week ending May 30 and was 2,346,000 barrels. During September and October of this year the average daily production has been as follows:

For the week ending	Average daily production in barrels	Daily variation from the previous week
Sept. 5....	2,138,850	
Sept. 12....	2,138,050	5,800 decrease
Sept. 19....	2,131,600	1,450 decrease
Sept. 26....	2,107,400	24,200 decrease
Oct. 3....	2,096,250	11,150 decrease
Oct. 10....	2,094,800	1,450 decrease
Oct. 17....	2,082,900	11,900 decrease
Oct. 24....	2,065,950	16,950 decrease
Oct. 31....	2,063,850	2,100 decrease

These figures suggest that a long, gradual declining output is under way.

THE FUTURE SUPPLY OF SHALE OIL

The figures arrived at to express the future supply of oil from wells may seem impressive, if not compared with still more impressive figures in relation to shale oil. The supply of oil derivable from shale in Colorado is conservatively placed at 80,000,000,000 barrels; in Kentucky at 50,000,000,000. Together this amounts to 130,000,000,000 barrels, or more than 13 times the amount of well oil estimated by one committee and nearly 25 times the estimate of the other. Colorado and Kentucky alone are considered because the facts are better known there than in other states. It is a well-known fact, however, that great beds of oil shale exist in Oregon, California, Nevada, Utah, Wyoming, Indiana and Ohio, which, if added to the Colorado and Kentucky supply, would indicate an available supply of shale oil that could be expressed only by a most liberal use of astronomical figures.

CONCLUSION

The oil situation is indeed critical; the solution requires sober thought and wise action. To one who can view present-day facts calmly and can vision the future clearly, several basal facts must be evident. Our advancing civilization will demand a smokeless fuel, of high heat value, of comparatively small volume, and convenient to handle.

Smoky, grimy cities will be a thing of the past. The use of raw coal as fuel will be prohibited in our cities. The entire smoke nuisance with its dirt and economic loss will be overcome. The solution lies in the use of fuel oil. Oil, like any other natural deposit, has an end; the end of well oil is in sight, but the end of shale oil is so remote—centuries away—that its end need not be seriously considered. The development

of the oil shale industry, with its necessary demand on labor, machinery, buildings, and a long list of public and private necessities, spells an economic and industrial improvement to meet the needs of civilization that will rival, if not surpass, the steel, coal, motor, or agricultural industries.

Which, then, is to be chosen—an oil field or an oil shale field?

SAFETY IN DRILLING OIL WELLS

Bureau Of Mines Investigation Shows Causes For Majority Of Accidents In Drilling—Special Bulletin Released

THE importance of the use of proper mechanical safeguards as a protection to employes in the drilling of oil wells by the rotary method is emphasized by the Bureau of Mines, following a study of the subject made by H. C. Miller, associate petroleum engineer.

Statistics compiled in the California oil fields show that 13½ percent of the total number of accidents due to machinery at drilling and producing wells are caused by the machinery of the draw works. The number of days actually lost by the oil workers as a result of these accidents represents 21½ percent of the total number of lost days that can be charged directly to the drilling and producing machinery. Many of these accidents can be avoided by installing proper safeguards. Oil-well machinery safeguards are relatively simple, are inexpensive to construct and install, and when once installed are an integral part of the draw-works machinery, movable with the drilling outfit from one location to another. The cost of constructing these safeguards is practically a negligible part of the original cost of the drilling machinery and requires virtually no additional operation and maintenance charge.

In the past those interested in safety work in the oil fields have considered only exposures at the front of the draw works as dangerous enough to justify guarding. Safety engineers, after thorough study of the causes of accidents at drilling wells, found that the number of injuries caused by the sprockets and chain in the rear of the draw works warranted safeguards there also.

The hazards at the high-gear drum drive-chain and sprockets are generally considered less than those at the low-gear end of the draw works. Although they are not as frequent, accidents at the high-gear end are not uncommon, and provisions should be made to minimize all chances of injury.

Engineers and others in authority, when designing guards, should bear in

mind that one of the most important features of guards for rotary drilling machinery is that the machinery covered must be readily accessible for examination and repair.

Bursting of the rotary brake-flange rims has been responsible for six recent fatalities and many lost-time accidents in the California oil fields. The intense heat generated by "throwing" on the brakes in checking the rapid descent of the drill stem or string of pipe produces stresses that expand the rim, thus weakening the drum flanges so much that many flanges burst.

Wherever drive chains are exposed a hazard exists, but few are so great as that of the rotary table drive-chain of a chain-driven rotary. Many men have been seriously and fatally injured between the unguarded sprockets and drive chain.

Exposed gears, no matter where located, are dangerous and, unless they are properly inclosed in a metal casing or otherwise securely guarded, are a constant hazard to workmen.

The small number of accidents caused by the rotary table is gratifying though somewhat surprising. The casual visitor at a drilling well, when the floor is so often muddy or wet and slippery, would consider nothing short of a standard two-rail railing as a proper guard for a rotary table in motion. Fortunately, no such drastic precaution is necessary. Some companies, however, partly inclose the space between the top of the gear table and the table base by a guard to prevent workmen from coming in contact with the teeth on the underside of the gear table or the sharp edge of the table.

Unguarded engine flywheels are a menace to those working in their vicinity. In the oil fields a number of fatalities and many serious injuries have been caused by the unguarded flywheels of single-cylinder drilling engines.

Many oil-field accidents have been caused by steam that leaked past the throttle valve, accumulated in the steam

chest, and turned the engine over while men were repairing, oiling, or working around the engine, chains, and draw-works machinery.

Many bursting flywheel accidents can be attributed directly to loose hub bolts or to overweighted rims. Hub bolts should be examined at frequent intervals and always kept tight.

Catheads should never be used when grooves or ridges have been worn in them, as accidents caused by ropes sticking in the grooves and not slipping properly often occur. Every worn cathead is a menace to the safety of those working in the derrick.

Although many drillers shut down the machinery while oiling it, at times the machinery must be oiled when in motion. For both economy and safety every employer should provide oil cans or oilers equipped with long spouts, so that while a man oils machinery his hand and arm can remain a safe distance away from the moving parts. Gloves, especially those of the gauntlet type, should never be worn by a man oiling machinery. All safeguards should be securely fastened over the machinery that they guard.

The results of this study are given in Technical Paper 369, "Mechanical Safeguards in Rotary Drilling," copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

PERMISSIBLE GAS MASKS

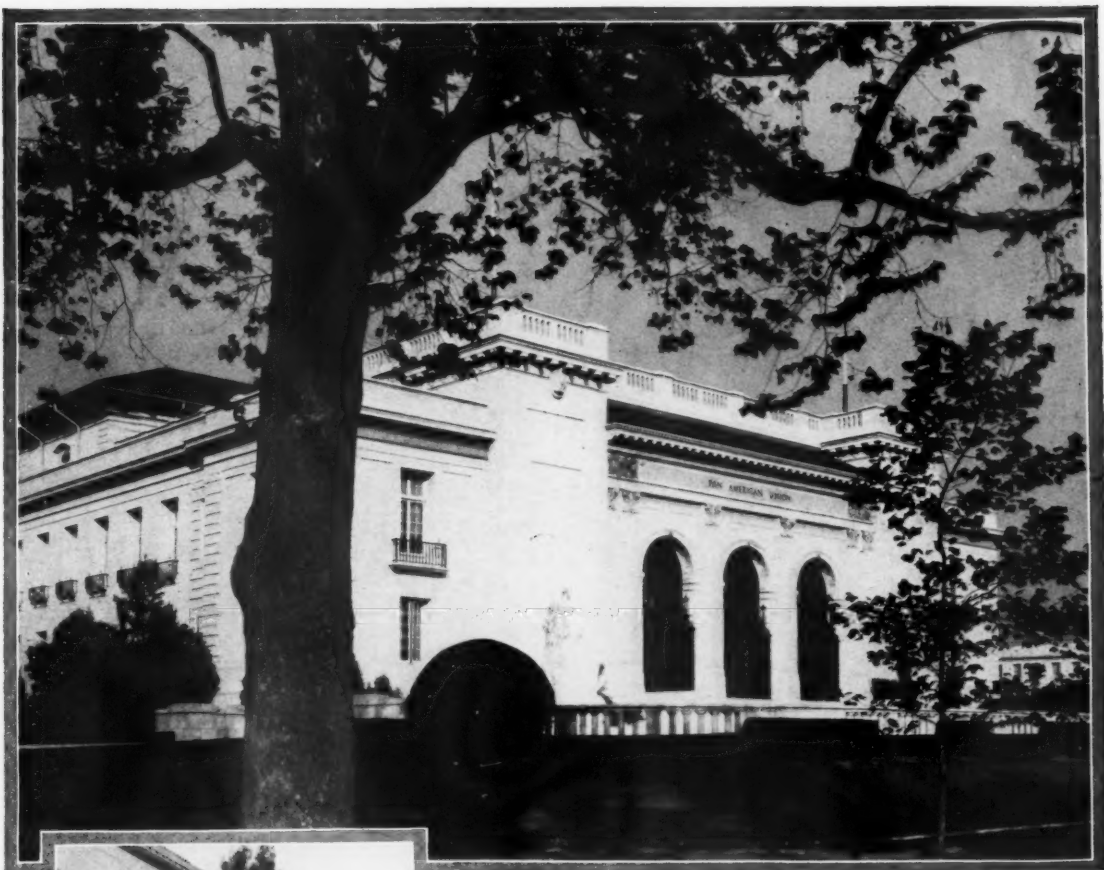
THE Bureau of Mines in its investigation of gas masks for use in mines and allied industries has studied and developed various types of masks for protection against noxious gases and fumes that may be present in atmospheres encountered in mines, metallurgical works, chemical, and other industries. As a result of these investigations, the bureau issued a schedule of tests under which manufacturers who voluntarily submit masks for examination and test, are issued an approval certificate for masks that meet the bureau's specifications. In the bureau's schedule masks are classified by types of gases removed, as type A masks for protection against acid gases; B, organic vapors; C, ammonia; D, carbon monoxide; E, smoke, dust, and mist; F, special gases; combination types and type N, for protection in air against all gases, vapors, and smokes.

A bulletin just has been issued on the results of the investigation. It is entitled "Gas Masks for Protection in Air Against All Gases, Vapors, and Smokes." Its authors are A. C. Fieldner, S. H. Katz, H. W. Frevert, and E. G. Meiter.



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WESTERN DIVISION HOLDS ANNUAL MEETING

*Western Division Of The American Mining Congress Holds Important Meeting At Phoenix—
Jesse F. McDonald Chosen Chairman Of Board Of Governors—Headquarters Located At
Denver—Important Action Taken On Western Mining Questions*

A LARGE delegation of representative leaders of the western mining industry attended the annual meeting of the Western Division of the American Mining Congress at Phoenix, Ariz., November 16 to 19. Jesse F. McDonald, of Leadville, former governor of Colorado, was chosen as chairman of the board of directors of the division, and the headquarters were ordered established at Denver. A number of resolutions were passed suggesting improvements in conditions under which mining operations in the western country are conducted. An important action taken was that protesting against the imposition of additional taxes by the Internal Revenue Bureau through a proposed revaluation of copper mines for 1919 and subsequent years. The mining men took the position that as a revaluation of silver properties for the same purpose had recently been rejected by the bureau, the same considerations applied to copper. The meeting also went on record as favoring uniform state laws similar to those of Colorado and California prohibiting the high grading of ore. The operation of grazing and homestead laws were declared by the mining representatives to operate unfairly against mining prospectors in the development of minerals, and a resolution was adopted requesting the Interior Department to amend the land law regulations so as to remove some of the present hardships imposed upon prospectors, including the abolition of the bond requirement.

The meeting considered matters affecting silver production, and went on record as favoring broad and liberal interpretation by the Treasury Department of the Pittman Act for the purchase of silver by the Government at \$1 per ounce in the interest of silver producers, which was interpreted as implying that the Government should purchase additional silver under that act to complete purchases as contemplated by the law. A bill for this purpose was passed by the Senate during the last Congress but failed in the House. It proposed the purchase of 14,000,000 ounces of silver at \$1 per ounce to complete purchases under the act. This legislation will be reintroduced when Congress meets next month and will have the solid backing of the western mining men.

MINE STATIONS

Consideration was given by the meeting to the new relations of the Bureau of Mines, because of its transfer from

the Interior Department to the Department of Commerce. The work of reorganizing the bureau was reported on by L. S. Cates, of Salt Lake, president, and J. F. Callbreath, of Washington, D. C., secretary of the American Mining Congress, who are members of the advisory committee of mining men which has been cooperating with Secretary Hoover in reorganizing the bureau's policies. The meeting did not favor consolidations or decreases in the work of the western experiment stations of the bureau.

Taxation and mine freight rates were also considered, and the meeting passed a resolution expressing its appreciation for the work of the American Mining Congress and its taxation and traffic committees along these lines.

The resolution proposing relief for prospectors on mining lands from present restrictive Government regulations was brought forward by M. E. Dittmar, of San Francisco, who complained that prospectors are vanishing from the western mining regions, which was to be deplored, as the importance and proper development of the mining industry dictated encouragement of mine prospecting. He advocated that railroads encourage mine prospecting on their land grant holdings, and a more liberal attitude by the Government for prospectors in forest reserve.

M. B. Tomblin, of Denver, was re-elected secretary of the Western Division. The sessions of the meeting were held at Chandler, near Phoenix. The closing days of the meeting were devoted to a tour over the Apache Trail and an inspection of irrigation works and mines and plants of Arizona's principal mining and smelter operations. The suggestion that western railroads open their land grants to mine prospecting was advanced by Mr. Callbreath, based on consideration of land grant matters by a committee appointed at the last annual convention of the American Mining Congress. Mr. Callbreath also participated in the discussion preceding adoption of the resolution against revaluation of copper mines, outlining the legislative and departmental situation surrounding this matter. He stated that the proposed revaluations were based on inadequate and unfair mine depletion allowances.

The Bureau of Mines was represented at the meeting by B. O. Pickard, of the Berkeley, Calif., Station, and E. D. Gardner, of the Tucson, Ariz., Station.

Immigration was discussed by Mr. McDonald, who said that the present immigration restriction law had deprived the western mining industry of 15,000 common laborers from Mexico.

A. G. MacKenzie, of Salt Lake, secretary of the Utah Chapter of the American Mining Congress, conducted a conference on mine taxation, during which he referred to the possibility that, in consideration of the new tax law, Congress might change or repeal the present discovery and depletion clauses. He urged mining men to act as a unit in defending these depletion allowances as they are the only methods by which the original cost of a mine can be deducted. Without depletion, he said, it would be impossible to encourage capital to develop new properties, and repeal of the law would also seriously affect small operators and prospectors.

Methods of preservation of mine timber were outlined by George M. Hunt, of the Forest Products Laboratory of Madison, Wis.

Industrial relations were considered and vocational education was said to be an important means of interesting mining workers in their duties. The details of the meeting were handled by Robert E. Tally, of Jerome, Ariz., chairman of the western division last year, and W. B. Gohring, of Phoenix, secretary of the Arizona Chapter of the American Mining Congress. The resolutions committee, which considered the policy declarations of the meeting, was composed of Mr. Gohring; R. I. Kerr, of California; Horace Moses, of New Mexico; A. P. Ramstedt, of Idaho; Mr. MacKenzie; Sidney Norman, of Oregon; and Mr. McDonald. The closing of the meeting was marked by a banquet at Globe, which was tendered by the Arizona mining delegation. The division was invited by the Department of Mines and Mining of the Sacramento Chamber of Commerce to hold its annual meeting in Sacramento in 1927.

The Geological Survey issued a report on mineral investigations in Alaska in 1923.

"Pessimism regarding Alaskan mining is disappearing," says the report. "There are in the Territory abundant mineral resources that can be profitably exploited by the use of improved mining methods. Alaskan mining has passed through its period of lowest depression and is being gradually built up on a stable basis."

WORK OF THE MANUFACTURERS' DIVISION DURING 1925

Three Years' Work Shows Value Of Organization To Both The Practical Operating Official And The Manufacturer Of Mining Equipment—Expositions Have Been Highly Successful And Results Of Division Constructive

By J. C. WILSON *

THE Manufacturers Division of the American Mining Congress was organized in 1922 for the purpose of creating a permanent co-operative organization of manufacturers who could work with the American Mining Congress in the development of a closer relationship and a closer cooperation between the users of mining equipment and the manufacturers of such equipment. It was generally recognized that the interests of these two groups were mutual and that there should be a fine field for constructive effort in connection with the development of an interchange of ideas and a discussion of the problems of mine operation and cost reduction.

The natural medium for the development of the work of the division has been the expositions of mines and mine equipment which have become a permanent feature of the work of the American Mining Congress and the formation of the division which made it possible to arrange and stage the expositions of coal mining equipment and machinery at Cincinnati, Ohio, in 1924 and 1925, have been vindicated by the success of these expositions and the extremely constructive discussions of practical operating problems which have taken place.

The large attendance at the conventions during the past two years of practical operating officials indicates clearly the value of the work of the division and the importance of these annual meetings devoted purely to a discussion of practical operating problems.

The meeting held in Cincinnati during the week of May 25, 1925, was notable because of the constructive value of the program which had been worked out and developed by a representative committee of practical operating officials. The subjects presented covered questions of vital interest to the operators and brought out the point of view of the practical men in the industry in the solution of many of the problems of the effective handling of mine equipment and supplies. A noticeable feature of the meeting was the interest taken by the larger operating companies and the number of men which these companies sent to Cincinnati to participate in the discussions. All of which indicates that the benefits derived from such discussions by both operators and manufacturers are of inestimable value to all concerned.

Under the direction and supervision of the Manufacturers Division, the expositions of coal mining equipment and machinery have made steady progress and in 1925 it was noticeable that all classes and types of coal mine equipment were represented on the exposition floor. These expositions combined with the discussions of practical operating problems make it possible for the operating official to secure as complete a survey of the mine equipment field as is possible and to obtain the double benefit of a general discussion of operating problems and an opportunity to inspect the various lines of equipment in the minimum amount of time.

The division functions as an integral part of the American Mining Congress—the national organization representing all phases of mining. Its members have the advantage of direct contact through the American Mining Congress with all of the work of the organization and the cooperation between the manufacturers and the operators is steadily developing.

In the carrying on of its work and in the development of the interests of the practical operating officials in these annual meetings, the Manufacturers Division has had the cordial support and endorsement of other representative bodies, including the National Coal Association, Coal Mining Institute of America, and a number of the local state coal operators associations. It is fitting at this time to express the appreciation of the members of the division of this hearty cooperation in the development of its work and to express the hope that in the further development of these annual meetings an even closer contact may be effected between the division and the operating men in the industry.

From the standpoint of the members the division has functioned very successfully during the past three years. Its organization has been vindicated and it has proven that through the creation of a permanent cooperative body, it is possible not only to increase the quantity and quality of the attendance at these meetings, but to arrange the expositions on a cooperative basis in such a way as to reduce expenditures for the members of the division as well as to increase the sales and advertising benefits to be derived.

The Manufacturers Division is in no sense a closed body. Every manufacturer of mine equipment and supplies catering to the mining field in any of

its different phases will be gladly welcomed as a member of the division, for it is the purpose of the members of the division to develop a program of work which will be of real value to the mining industry and which will be of assistance in the carrying on of the important work of the American Mining Congress. It will continue to arrange the annual or biennial expositions of mines and mine equipment and to develop as far as possible a discussion of practical operating problems in conjunction with these exhibits.

At the present time it is more and more evident that many of the difficult problems in the mining industry can only be effectively solved through the further development of methods and practice which will tend toward cost reduction and greater efficiency. The Manufacturers Division is anxious to cooperate in every possible way with the practical operating officials in order to bring about such results.

Cooperative effort of this character is essential and the success of the annual meetings and of the work of the Manufacturers Division is the best evidence of the need for such effort and the value which can be obtained through the years to come.

RESEARCH AT BUREAU OF STANDARDS

THE interesting plan by which the Bureau of Standards of the Department of Commerce opens up its research facilities to the industries is little known. Thirty-six national organizations have research associates in the Bureau laboratories engaged in experimental research. It all began with the act of Congress which authorized the use of the Government's facilities for study and research. Out of this has grown to its present size and usefulness a unique system of cooperative research.

A list of typical results thus obtained showed some 75 subjects ranging from the structure of atoms and the rays characteristics of the chemical elements to building construction and packing box standardization. They comprise fundamental science and its applications to very practical problems of industry. Research associates at the Bureau of Standards are pioneers in new fields of discovery. To extend the frontiers of knowledge by scientific research and discovery is a fascinating and enduring public service. These discoveries save industrial waste, ensure high quality, minimize failure, and are becoming profit-bearing assets to industry.

*Chairman of the Board of Governors. Ohio Brass Company.

CALIFORNIA MINERAL ASSOCIATION REPORTS CONSTRUCTIVE WORK

President Paxton In Annual Report To Membership Shows Splendid Service Given By California Mineral Producers' Association—State Legislation To The Fore—Future Work Outlined

DURING the year the association has enjoyed the support and co-operation of the American Mining Congress in all matters pertaining to Federal legislation and regulation. The annual meeting of the Congress will be held at Washington, December 10-11, 1925. The annual meeting of the Western Division of the said Congress was held at Phoenix, Ariz., November 16-19, 1925, where attention was devoted exclusively to a consideration of the essential problems of western mining for presentation at the annual meeting in December.

FEDERAL LEGISLATION

The 68th Congress, which adjourned March 4 of this year, is reported as having passed 994 laws out of 18,332 measures proposed, during an almost continuous session of two years.

Bills under consideration, referred to in my last annual report, providing for Blue Sky legislation and changes in the transportation act were not favorably considered.

The 69th Congress will convene on December 4, at which time tax revision, transportation and public land grant legislation will, according to press reports, receive major consideration. A material reduction in Federal taxation and the consolidation of main line and parallel railroad systems, as advocated by President Coolidge, will, in a measure, tend to relieve some of the burdens incident to mining operations. When we received information that the Interstate Commerce Commission would hold a meeting in San Francisco on November 16, 1925, to hear evidence upon the application of western railroads for a general increase of 5 percent in freight rates, the Western Division of the American Mining Congress joined with the Arizona Chapter in the submission of a general protest against such increase.

The general Federal tax committee of the said Congress, representing the mining interests, appeared before the Ways and Means Committee of the House in October, 1925, in support of income tax revision that has received the approval and endorsement of those engaged in the mining industry. A further meeting of this committee will be held in Washington December 9, 10 and 11, 1925.

At a meeting of the Public Lands Committee of the United States Senate, recently held in San Francisco, general

By ELMER E. PAXTON*

protest was made in behalf of the industry to any further extension of national park and national forest areas to lands subject to mineral classification, and to the bond provisions of the 640-acre grazing homestead act.

The evidence brought out at the hearing clearly indicated the disapproval of those interested to any further encroachment by the Federal Government on state rights in the control and regulation of natural resources.

STATE LEGISLATION

The principal activity of the association during the past year has been in connection with legislation proposed at the forty-sixth session of the California Legislature. The report of the Secretary-Treasurer, issued immediately following the adjournment thereof, covers in detail all activities respecting legislation proposed and adopted, in which connection it is my pleasure to report that practically no legislation detrimental to the mining industry received favorable consideration.

Legislation proposed and sponsored by this association, intended to curtail the practice of high-grading in California mines, passed both houses without a dissenting vote and was approved by Governor Richardson on April 15. The measure will be administered by the state mineralogist as licensor, instead of the secretary of state, as is the practice in Colorado.

Assembly bill No. 1295, providing for an appropriation of \$10,000 for an investigation of plans that will result in the resumption of hydraulic mining within the state, was also passed and received executive approval.

Assembly bill No. 470 providing for a reorganization of the State Mining Bureau was passed but pocket vetoed by the governor.

Legislation proposing old age pensions, the repeal of the criminal syndicalism act, regulation defining so-called "black-listing, employment regulations during strikes, and certain drastic amendments to the workmen's compensation, insurance and safety act, increasing the liability and cost of compensation insurance," were introduced but either failed of passage or did not receive executive approval.

The Board of Directors are indebted to the membership for the cooperation extended in connection with their efforts

in the support and defeat of proposed legislation.

SILVER PRODUCER'S ASSOCIATION

The association has continued its co-operation with the Silver Producers Association in an effort to stabilize the price and increase the uses of silver. A communication addressed to banks and large employers of labor throughout the state requesting a more general use of the silver dollar as a medium of exchange, as recommended by Secretary Mellon of the Treasury Department, met with a most favorable response and has resulted in a much wider use of such metal in our currency structure.

The association, through the American Mining Congress, was represented at Washington at recent hearing held before the Internal Revenue Bureau in opposition to an order providing for the revaluation of silver mines for 1919 and subsequent years, also a plan to be used as a basis for future methods of valuation of mines for purposes of taxation. A recent decision by Commissioner Blair indicates a victory for producers with respect to the price of silver to be used in determining property values as of March 1, 1913. Silver prices are advancing and the outlook is encouraging. The Dawes plan is restoring silver coinage in Europe in place of war paper, and a wider field is opening for its use in the arts and industries.

STATE AND FEDERAL AGENCIES

The association has had during the past year the continued support and co-operation of the Berkeley Safety Station, United States Bureau of Mines, the Mining and Safety Department of the Industrial Accident Commission, the State Mining Bureau, the Los Angeles Chamber of Mines and Oil and the United States Geological Survey.

The interest taken by the Berkeley Safety Station in the training of men employes in first aid and mine rescue work represents a material factor in the prevention and treatment of accidents incident to mining operations. Copies of publications, and reports dealing with investigations made of the various problems confronting the operation of metal mines are available upon application. In accordance with the request of this association, it is expected that the said agency will institute an investigation during the coming year that may ultimately result in plans that will lead to the rehabilitation of large scale placer mining within the state.

Under date of October 13, 1925, the

*General Manager Engels Copper Mining Co. President California Metal & Mineral Producers Association, and California Chapter, the American Mining Congress.

secretary caused to be filed with the sub-committee appointed to report on the revision of the work of the Bureau of Mines, as a result of its transfer to the Department of Commerce, the protest of this association to any action which might deprive the industry of the valuable services now being rendered by the Berkeley Safety and Mine Rescue Station.

In the enforcement of legislation intended to curb the practice of high-grading in California mines, and in all matters pertaining to the welfare of the industry, the association is receiving the united support and cooperation of State Mineralogist Root of the Mining Bureau.

A valuable service has also been rendered the industry during the past year by the California Development Association, an organization engaged in the development of industrial payrolls within the state. The work of this association in the development of the cotton, steel and mining industries during the past year is worthy of special mention. The plan of operation provides for action by a general mining committee supported by representative groups of all branches of the industry in both northern and southern California. A similar valuable service is rendered by the Mining Department of the Sacramento Chamber of Commerce, the Chamber of Mines and Oil of Los Angeles and by local chapters of the American Mining Congress located in Grass Valley and the Randsburg section. It will be the policy of the Board of Directors to cooperate with these various agencies in the general development of the mining industry.

DREDGE OPERATORS SECTION

Meetings of the Dredge Operators Section of the association have been held regularly throughout the year.

While the problems confronting this branch of the industry may not be as extensive as those confronting the lode miner, we appreciate their support and cooperation in our efforts to maintain the standard of the industry in the development of the mineral resources of the state.

WORKMEN'S COMPENSATION INSURANCE

Several complaints referring to the high cost of workmen's compensation insurance have reached the office during the past year.

Tabulation compiled by the State Compensation Insurance Fund, at the request of this office, covering the latest available experience of members of this association report a loss ratio of 91.6 percent and an average dividend payment of 20.5 percent.

These figures clearly indicate a loss to the said fund in this particular class of business. It is obvious that such a situation cannot continue indefinitely. The reduction of accident frequency by more intensive safety and first aid campaigns

seems to provide the only source of relief. The facilities offered the industry by the Berkeley Station, United States Bureau of Mines, and the Safety Department of the Industrial Accident Commission in such first aid and mine rescue training is most effective in this respect and is always available.

FUTURE ACTIVITIES

In addition to keeping in close touch with legislation proposed at the coming session of Congress, the association finds it advisable to cooperate with the state mineralogist in the enforcement of legislation, heretofore referred to intended to curb high-grading practices. In accordance with the recommendation of Director Grant of the United States Mints, submitted at a conference held in San Francisco in August of this year, Mr. George F. Dayton, of Denver, deputy secretary of state and licensor of ore buyers under the Colorado act, was engaged to come to the state and confer with the state mineralogist and with officers of this association in the adoption of the plan of operation under which Colorado has so successfully operated during the past ten years. This action has resulted in mutual benefit to all concerned, and will tend toward a more strict enforcement of its provisions. We have

been advised that the recoveries made of stolen ore in Colorado has been more than sufficient to meet the expense incident to such enforcement.

I regret to report that the files of the secretary contain letters of resignation from Directors Albert Burch and O. J. Eggleston, due to their removal from the state. Our records show that Albert Burch took an active part in the organization of this association, and that he has served continuously as a director since such organization. He was also its first president, serving in that capacity from October, 1914, until October, 1919, and the success of the institution is due in a great measure to the valuable services rendered by Mr. Burch as president during this period. Director Eggleston has also well and faithfully served the association as a member of its Board of Directors for the past five years. I join with my fellow members of the board in expressions of regret at their retirement, and take this opportunity to thank Directors Burch and Eggleston in behalf of those engaged in the industry for their service.

The thanks of the Board of Directors is again extended to the membership for their continued support and cooperation in the conduct of the affairs of the association.

ARIZONA OPERATORS HAVE EXCELLENT ORGANIZATION

The Meetings Of The Arizona Chapter Held In The Mining Camps Have Promoted Splendid Spirit Of Cooperation And Resulted In Better Understanding

By W. B. GOHRING*

THE officers and directors of the Arizona Chapter are: G. M. Colvocoresses, governor; W. S. Boyd, 1st vice governor; John C. Greenway, 2nd vice governor; F. W. MacLennan, 3rd vice governor; W. B. Gohring, secretary, and P. G. Beckett, W. S. Boyd, G. M. Colvocoresses, Jas. S. Douglas, John C. Greenway, J. P. Hodgson, Wm. Koerner, J. Kruttschnitt, Jr., F. W. MacLennan, W. G. McBride, T. O. McGrath, T. H. O'Brien, Robert E. Tally, F. A. Woodward, directors.

The chapter maintains a business office in Phoenix, the capital city of the state. Through this office the industry gathers monthly statistics on production, employment, payroll and similar data, and keeps in contact with other industries and movements in the state.

Meetings are called several times each year, and these are usually held at one of the mining camps. The policy of the organization has been to gather at these meetings members of the staff from each of the companies, and through papers read by the home staff, and

through trips to the mines and plants of that particular district, these men get a line on the other fellow's job and problems. Much good has doubtless resulted from this exchange of information, and as a further result the mining fraternity of Arizona, although separated by the hundreds of miles between the various camps, have become pretty well acquainted amongst themselves, and any improvement in technical practice is soon common property.

Details of costs and operations are freely given at these meetings, discussion and exchange of ideas between men in the same branch of work is without restraint, and it is probable that the standards of technique and practice in mining, milling and smelting throughout the state are improved as a result. I do not question but what the greatest direct benefits from our union together through our Arizona Chapter are along this line.

During 1925 we have had two such meetings, one in March at Ajo, where the operations of the New Cornelia Copper Co. were discussed, and the other in September at Morenci, where we were

*Secy., Arizona Chapter, American Mining Congress.

the guests of the branch of the Phelps Dodge Corporation operating there. At all these meetings the directors have a business session at which any matters of mutual interest, such as markets, freight rates, the use of copper, national policies or what not, may be discussed.

At the present time the active membership of the chapter is almost exclusively connected with copper production, as our gold mines have been pretty well worked out.

It may be of interest to note that the number of employes in mining, milling and smelting copper in Arizona is 17,700,

with a monthly payroll of \$2,400,000, these figures covering all the regular producers, but not the isolated mines of intermittent production. The figures cover probably 90 percent of Arizona mining activities.

At the present time the principal outside activity of the chapter is in freight rates. We are parties of record before the Interstate Commerce Commission in their Dockets 17,000 and Ex Parte 87, and are making a formal showing of our belief that the proposed 5 percent increase in rates on western railroads would be unfair to the mining industry.

THE ANTHRACITE BUREAU OF INFORMATION

This Bureau Was Organized To Collect, Classify, And Distribute Information Concerning The Anthracite Industry, But Has Been Called Upon To Serve In Many Additional Capacities

By E. W. PARKER*

THE Anthracite Bureau of Information, as its name implies, is an organization maintained by the anthracite industry for the purpose of collecting, classifying and distributing information, statistical and otherwise, of interest to anthracite producers, distributors, and consumers. It has just passed its tenth birthday, having been created in 1915 by the united action of the anthracite producing companies. Nearly half a century prior to its creation, under the inspiration of men like Gowen, Sloan, Packer and Parrish, attempts had been made to put an end to the relentless competition, which then was bringing ruin to the anthracite industry, as it is at the present day, bringing bankruptcy to a large number of bituminous coal-producing interests. In order to bring order out of chaos and establish stability in the industry the carriers, who were then interested in the production as well as the transportation of anthracite, agreed to allotments of the tonnage on percentage bases, the production of independent operators being purchased by the carriers and considered in the allotted tonnage.

To make the agreements effective it was necessary to secure the impartial collection and reporting of shipment statistics, and the Bureau of Anthracite Coal Statistics was established with the late John H. Jones as chief of the bureau. He was succeeded in 1890 by William W. Ruley (also deceased), who continued in charge until 1910, and was in turn succeeded by A. H. Armstrong. With the establishment of the Anthracite Bureau of Information the anthracite carriers divested themselves of all interest in or responsibility for the Bureau of Anthracite Coal Statistics, whose

activities were taken over by the Bureau of Information and its chief, Mr. Armstrong, became secretary of the new bureau.

In its present capacity as an agency for the anthracite producers, the bureau has been called upon to serve in a variety of capacities. At the time of its organization Europe was already in the World War, and when, in less than two years afterwards the United States became involved, the bureau at once became a part of the working force of the Anthracite Committee which formed a part of the United States Fuel Administration. By reason of statistical records it possessed and its capacity for rapid expansion to meet the needs of the situation, it was able to render valuable aid to the Anthracite Committee in the regulation and apportionment of anthracite distribution. Also, by instruction of the then General Policies Committee of Anthracite Operators (now the Anthracite Operators' Conference), the bureau established headquarters in the city of Washington for the purpose of looking after the Government's requirements of hard coal while war conditions continued, the industry pledging itself to give first consideration to the Government's call on the available tonnage. That the anthracite operators carried out their obligations is attested by numerous letters of commendation received from department officials, civil and military.

The work performed by the Philadelphia office of the bureau during the war in cooperation with the Fuel Administration was epochal in character. The Anthracite Committee of the Fuel Administration, following the war-time rule of avoiding long hauls, and especially "cross-hauls" as much as possible, and with a view to securing equitable distribution, made allotments of tonnage. The

coal year from April 1, 1916, to March 31, 1917, was taken as the basic year. Reports of shipments by every distributor (operator, agent, and wholesaler) to every community in this country and Canada during that year were obtained and tabulated, and on the record thus obtained allotments of the estimated available tonnage, after deducting the Government's estimated requirements, were made. All shippers and distributors were required to make monthly reports of their shipments of both domestic and steam coal to each community, and as these were received and tabulated it was possible to tell at a glance whether any given town was getting its full share of the tonnage shipped, and not more than its share.

The collection of distribution statistics was continued for several years after the war necessities had passed. They proved of inestimable value in the emergency following the long strike of 1922, when the authorities of anthracite-consuming states, in cooperation with the anthracite operators, the Federal Fuel Distributor, and the Pennsylvania Fuel Commission, undertook to distribute fuel as fairly as might be possible during the succeeding winter. The Director of the Anthracite Bureau of Information was made Director of Distribution, and although few, if any, communities got all the anthracite they wanted, there was not, to the writer's knowledge, any case shown where a state or community had not obtained its fair proportion. By March 1, 1923, the need for any control of distribution had passed. The keeping of distribution records in the Bureau of Information has been discontinued, but the history for seven years is maintained on statistical index cards exceeding 250,000 in number.

The availability of the small sizes of anthracite as cheap and desirable household fuel is of special importance at the moment. In addition to the Anthracite Bureau of Information, the anthracite industry as a whole maintains an organization known as the Anthracite Coal Service, with headquarters in Philadelphia and with service stations in six principal anthracite consuming cities. Competent engineers are at the service of fuel users, free of charge. In conjunction with this service is a traveling exhibit designed to show the merits of anthracite in general, and in particular to show how buckwheat coal can be utilized as a domestic fuel. Apparatus designed to burn buckwheat forms part of this display.

As part of the bureau's cooperation in this work numerous pamphlets and envelope stuffers on how to cut down the cost of home heating have been widely distributed. These little leaflets take so well that it is quite customary to issue them in lots of 100,000.

*Director Anthracite Bureau of Information.

SOUTHERN WORK SHOWS PROGRESS

The Southern Division, The American Mining Congress, Is One Of Its Newest Divisions—Mineral Survey Completed—Southern Convention Plans Announced

By W. H. LINDSEY *

THE Southern Division of the American Mining Congress was organized September 29, 1922, at Chattanooga, Tenn., for the purpose of promoting the development of the mineral industries in the South. Originally its membership was confined to the states south of the Potomac and Ohio Rivers and east of the Mississippi. In 1923 the states of Arkansas, Louisiana, and Texas were included.

The members of the board of governors are:

W. H. Lindsey, Napier Iron Works, Nashville, Tenn., chairman; J. B. McClary, Yolande Coal & Coke Co., Birmingham, Ala.; Percy D. Berry, Providence Coal Mining Co., Providence, Ky.; Lee Long, Clinchfield Coal Corporation, Dante, Va.; E. L. Hertzog, Cherokee Mining Co., Spartansburg, S. C.; W. S. Peebles, The Paga Mining Co., Cartersville, Ga.; S. J. Ballinger, San Antonio Public Service Co., San Antonio, Tex.; H. B. Flowers, New Orleans Public Service, Inc., New Orleans, La.; C. J. Griffith, Arkansas Central Power Co., Little Rock, Ark.; Dr. Joseph Hyde Pratt, consulting engineer, Biltmore, N. C.; W. H. Smith, secretary-manager of Chamber of Commerce, Laurel, Miss.; C. G. Memminger (Florida), president Coronet Phosphate Co., Asheville, N. C.

On February 16, 1925, the board met in executive session at Birmingham, Ala., at which time the American Mining Congress rendered a progress report on the survey being made by it of the

undeveloped mineral resources of the South, and ways and means were discussed with a view to opening an office for the Southern Division in some centrally located southern city as soon as adequate support for the division might be available.

The South has long been a source of raw materials, but not until recently have the tremendous advantages of climate, labor, and transportation in the Southern States received more than passing attention.

During this period vast development has taken place in electric power, and the utility companies have met every demand of industry. The South today leads all other sections of the country in the distribution of power to farm and fireside. A network of good roads is being rapidly constructed and coordinated, and railroad extensions, notably in Florida and Mississippi, mark the advent of the southern industrial movement.

For this industrial development to reach its normal expansion, however, requires a broad comprehension of the problems of the producer by the consumer, and a better knowledge of the requirements of the manufacturer by the shipper of raw material.

Coincident with these are the problems of attracting capital for the development of new areas, the creation of new markets under favorable transportation conditions, broad and constructive policies of taxation, and a general spirit of cooperation.

To accomplish this a meeting of the Southern Division will be held in Memphis, Tenn., February 15-17, which will

be composed not only of mining operators and mineral producers, but will be attended by the great construction agencies, the sand and gravel, ballast and road-building material companies, manufacturing consumers of the raw materials found in the South, delegates from the various chambers of commerce, banking and industrial associations, railroad officials, state geologists, university and mining-school professors and students, and invited guests of national prominence in industry.

The major theme of the whole conference will be the Industrial Development of the South's Mineral Resources. The important questions of private vs. public ownership, industrial cooperation, insurance and employers' liability, financing industrial development, and brief discussions of practical operating problems will occupy the attention of the convention, while speakers of national prominence will make the banquet an event to be anticipated and long to be remembered.

Results obtained from cooperative tests conducted at Pittsburgh, Pa., by the United States Bureau of Mines, and by the Safety in Mines Research Board at the British Experimental Station at Eskmeals, Cumberland, England, form the basis of a report on rock dusting just issued by the Mines Department of Great Britain under the terms of the arrangement for cooperative research made between the Safety in Mines Research Board and the U. S. Bureau of Mines. Copies of this report, known as Safety in Mines Research Board Paper No. 13, "Stone dust as a preventive of coal dust explosions, Comparative tests," by G. S. Rice and R. V. Wheeler, may be obtained from H. M. Stationery Office at Adastral House, Kingsway, London, W. C., 2, at a price of 3d. net, plus the cost of foreign postage.

*Chairman, Southern Division. President, Napier Iron Works.



Union Station, Washington, D. C. To the Left, the City Post Office, With the Government Printing Office Rising Above It

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BOULDER GRUBSTAKE ASSOCIATION

A Unique Association Organized By The Miners And Business Men Of Boulder, Colorado—A Statement Of Why It Was Organized And What It Has Accomplished

By L. E. GIRARD

A FEW years ago the Boulder Ore Sampling Company, that had been doing business for many years, received orders from the parent company to cease operations and junk its plant. Like orders were received at other plants throughout the state that were owned by the same company. Realizing that such a move was very disastrous to the mining industry in the district tributary to Boulder the miners and business men organized a company among themselves and bought the plant outright and kept it in operation. It is a community proposition, not organized for profit but as an aid to the metal mining industry and has proven to be the salvation of the small operator and miner who could not ship his output in carload lots, and of great benefit to the larger operator who benefits from the "mixes" of ore, thereby obtaining an equalization of railroad and smelter rates. But one of the greatest benefits is a satisfied clientele that feels a square deal is being given in the sampling, assaying and purchase of ores. Shipments are beginning to come to the Boulder sampler from other districts, on account of the reputation of the "square deal" idea. Only recently a carload shipment of ore was received from the Hudson Bay country.

The success of the sampler, and the realization that there were no prospectors in the hills, as of old, revived the spirit of cooperation that saved the sampler, and a meeting of business men and miners was called, early in the spring of the present year, and a committee was named to formulate rules and plans to get prospecting started again. The success of the plans outlined and put in operation by this committee is a testimonial to its wisdom, and at this date, nearing the close of the prospecting season for the year, the results are even more than were anticipated.

There were three questions confronting the committee—the proper method of raising the fund for financing the prospectors; the selection, and the overseeing of operations.

Blanks were prepared and members of the committee personally presented them to the merchants and citizens who pledged monthly payments toward the fund for a period of six months, May to October, inclusive. It may be said to the credit of the subscribers that the results of the canvas were very satis-

factory and that the pledges were kept up to a high percentage throughout the season.

In the matter of selecting prospectors it was realized that there would be a number of applications, both from home and abroad, and a motley lot of suggestions as to how and where prospecting should be done. To divide responsibility it was decided to have a committee of nine that a variety of interests might be represented thereon and the ones bound to follow some decisions of the committee would be shared by a greater number. Experience showed this plan wise as the dupes of fortune tellers and "magnetized wires" presented themselves insistently and are now condemning the assinnity of the committee in general. Applications from parties who wanted to prospect where leads were scarce and fishing good, or from those who had checker-boards on the seat of their pants from the wire seats on the court house lawn, were alike rejected. Only those were selected who were personally known to some members of the committee as active workers and knew the game.

Provisions were made for contracts with the men who went into the field, fixing the salary at two dollars per day, providing for weekly reports showing daily doings, for division of claims and shipments and per personal supervision by various members of the committee. Supplies, other than the ordinary tools for prospecting, were furnished from the fund. Locations were made in the name of the finder and in the name of the president of the fund who was designated as trustee for this purpose, 75 percent to the prospector and 25 percent to the trustee. Leases were taken under same provisions. Surveying and recording of claims were at the expense of the committee—through the generosity and cooperative spirit of the surveyor the surveying was donated, aided by members of the committee.

Many trips were made in the hills by members of the committee to personally oversee the work done and to inspect finds. Much assaying was done throughout the season, half the expense being borne by the fund and half by the county, through a donation by a generous board of county commissioners. Some shipments of ore were made, one fourth of the net returns reverting to the fund.

At a recent "sowbelly dinner" given by the Metal Mining Association and the Grubstake committee in Boulder it was decided to continue the fund for two months longer, making it a development fund for the purpose of developing through the winter one or more of the finds of the summer months. The response to the latter move has been generous and many new subscriptions have been registered—indicative of the growth of the cooperative spirit that is gaining and spreading throughout the district.

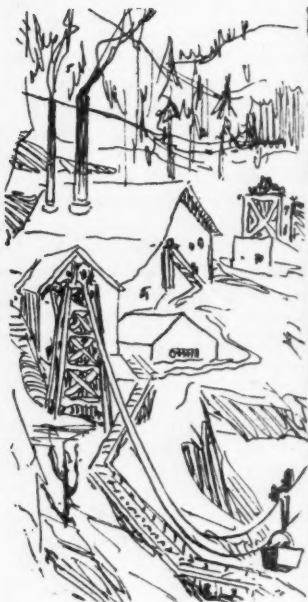
The net results of the season which are most apparent are two fine looking claims surveyed and recorded; a paying lease—possibly two; some shipments of ore; a splendid lot of publicity for Boulder and the Boulder mining district, and last, but not least, a better understanding of each others problems—those of the miner and the business man—in this district. While the net returns in dollars and cents have been no great amount, yet the cooperative and mutual spirit that has been developed will move mountains; moving mountains is mining, and mining brings riches. No man can fortell what the final result may be.

Accidents in the coal-mining industry of the United States in October caused a loss of 141 lives among the employees, according to information furnished by State mine inspectors to the Bureau of Mines. The October fatality rate for bituminous mines was 2.63 per million tons as compared with 3.03 for September and 2.89 for October last year.

The fatality rate for the first ten months of the year per million tons for bituminous mines was 3.26 as compared with 4.12 for the same period last year; the anthracite rate was 6.30 for the present year as compared with 5.46.

Current records of the Bureau of Mines covering "major" disasters, that is, disasters in which five or more lives were lost, show ten separate accidents with an aggregate loss of 198 lives in 1925 as compared with last year's 10-month record of nine separate accidents with a total loss of 452 lives. The per-million-ton death rate for both anthracite and bituminous mines based exclusively on these major disasters was 0.41 this year as compared with 0.96 during the first ten months of 1924.

An examination of the causes of the fatalities reported thus far in 1925 and a comparison of the record with that for January to October, 1924, shows slight reductions in the per-million-ton fatality rates for falls of roof, haulage, and electricity and a much more notable decline for explosions of gas or coal dust. The rate for accidents from explosives remained unchanged.



METALS

PRACTICAL OPERATING MEN'S DEPARTMENT

*Practical Operating Problems of the
Metal Mining Industry*



NEW FLOTATION MILL OF UNITED STATES SMELTING, REFINING AND MINING COMPANY

Mill At Midvale, Utah, To Be Completed By January—Will Handle 750 Tons Each Twenty-Four Hours In Fine Grinding And Flotation Sections And 600 Tons Each Eight Hours In Coarse Crushing Department—Will Handle Both Company And Custom Ores

THE new flotation mill of the United States Smelting, Refining and Mining Company is being built to handle complex lead-zinc-iron ores by differential flotation. Construction work was started last May and it is expected that the mill will be completed next January. The fine grinding and flotation sections of the mill will have a 24-hour capacity of approximately 750 tons, while the coarse crushing department will handle 600 tons in eight hours. The flotation and fine grinding sections are so designed that their capacity can be considerably increased by installing additional flotation and grinding equipment without interfering with the operation of the mill. There is also sufficient ground space so that the mill can be extended and its capacity practically doubled.

The mill will handle the ores from the company's mine in the Bingham district and also custom ores. On account of the variable character of the custom ores and the fact that it was desirable to have the mill so arranged that there could be considerable variation in the proportion of company ore and custom ore treated, it was necessary to have great flexibility in the fine grinding and flotation departments. For this reason the mill will be divided into three units

By C. A. LEMKE *

of equal capacity and the arrangement will be such that any one unit, any two, or all three units can handle either company ore or custom ore.

The mill is being built on a flat site. This has made necessary the construction of a trestle, about 1,000 feet long, in order to obtain height for the crude ore receiving bin. The mill site is on a level bench, which is approximately 35 feet above the area reserved for the deposition of the mill tailings. Thus, the tailings can be carried to the dump by gravity for a long period of time, and this was one of the factors that determined the choice of the site. The site chosen is also the most favorable one from the standpoint of future extensions, railroad switching and handling material such as repair parts for heavy machinery.

All mill buildings will have a steel frame and all foundations that support any considerable weight will be reinforced concrete. Only light foundations will be built of plain concrete. The walls of the crusher building, sampler building, conveyor galleries and the main mill building will be gunite applied on steel fabric of 2-inch mesh. The fabric has a stiff paper backing through which the wires are woven in such a way that the gunite can be applied on both sides of the paper. The gunite walls

will be 1¼ inches thick, ¾ inch on the outside of the paper and ½ inch on the inside. The roofs of these buildings will be built-up asbestos roofing laid on 2-inch tongued and grooved plank. The thickener building will be covered, both sides and roof, with corrugated galvanized iron.

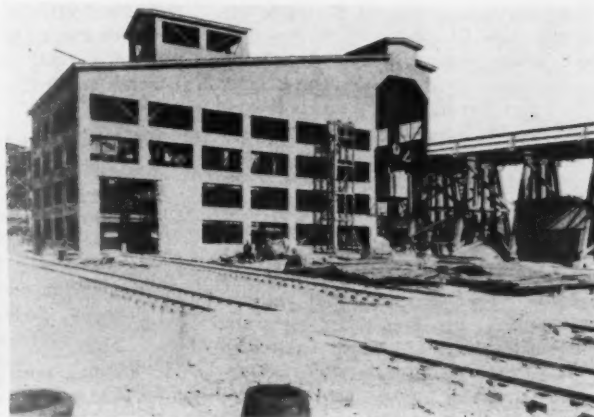
The trestle leading to the crude ore receiving bin is built of wood timbers. The track on about 70 percent of this trestle is laid on heavy stringers without cross ties so that it will be possible to stock ore from the trestle by merely dumping the railroad cars. The track on the remaining 30 percent of the trestle is laid on cross ties, but ore can be stocked therefrom by a locomotive crane. About 20,000 tons of ore can be stocked from the trestle. The trestle extends about 330 feet beyond the crude ore bin so that between the bin and the end of the trestle there is storage room for seven 50-ton railroad cars. The cars will be set by a switch engine as often as required and will be dropped down the track, which has approximately 2 percent grade, by hand and dumped into the crude ore receiving bin. Practically all cars used for ore loading are of the drop bottom full dump type.

The crude ore receiving bin has a capacity of about 125 tons and is intended for a receiving bin only and not for a storage bin. It consists of two V-shaped hoppers with all sides sloping

* Superintendent of Mills, U. S. Smelting, Refining and Mining Company.
Furnished through courtesy of D. D. Muir, Jr., General Manager.



General View of Plant; Thaw Shed in Foreground



South Side of Crushing Plant

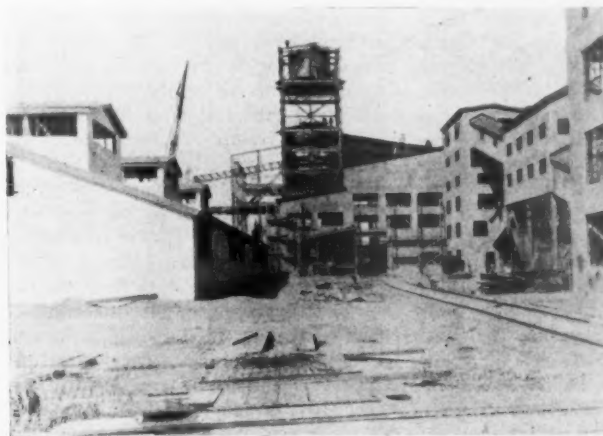
at an angle of 55 degrees from the horizontal and is practically self-cleaning. It was necessary to divide the bin into two parts in order to get sufficient horizontal length at the top to permit dumping all the ore in the railroad car at once and at the same time obtain enough slope on the sides to make the bin self-cleaning. Only very sticky, wet ores are likely to require any manual handling after being dumped into the bin. It will often be necessary to dump several different ores in one day, and for this reason a self-cleaning bin was required. Storage capacity at this point would have been a disadvantage rather than an advantage.

The crude ore will be fed from the receiving bin by means of two pan feeders to an inclined bucket elevator. This is a heavy chain elevator with 30-inch by 16-inch buckets. The chain is made of manganese steel and the buckets of $\frac{1}{4}$ -inch steel plate. The pan feeders are made of manganese steel. The discharge from the inclined elevator passes over a mechanical grizzly to a 14-inch bull-dog

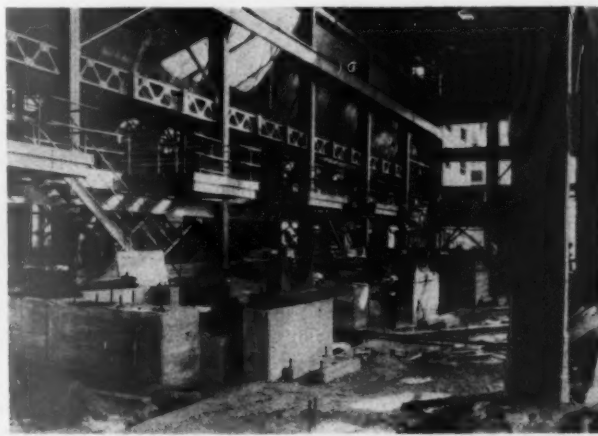
gyratory crusher which will be set to crush to $2\frac{1}{4}$ inches. The crusher product, combined with the grizzly undersize, is carried to Hammer screens by means of a 16-inch belt conveyor and either, or both, of two 16-inch bucket elevators. The screen oversize will be sent to 54-inch by 16-inch heavy duty crushing rolls which will be in closed circuit with the screens. There are two sets of rolls and two sets of Hammer screens—two screens to each set. The arrangement is such that the product from the rolls can be returned to either or both sets of screens and the rolls can be operated in series or in parallel. With this arrangement it will be possible to double the screening surface when ores are being handled which are difficult to screen. The Hammer screen undersize will be the finished product from the coarse crushing department. Screen cloth with $\frac{1}{4}$ -inch clear openings will be used when the mill starts. This will give approximately a $\frac{3}{8}$ -inch product, since the screens will stand at an angle from the horizontal. If it should

be found later that a coarser or a finer product is desirable, the screen size can easily be changed. Both the screens and the rolls will have excess capacity and it will not be difficult to obtain a finer product from the coarse crushing plant without any reduction in the capacity of the plant.

The screen undersize product will be discharged upon a 16-inch belt conveyor and carried to the sampler building where it will be sampled by automatic samplers of approved design. From the sampler building the ore will be carried to the storage bins by a second 16-inch belt conveyor, a tripper being used for distributing the ore to the several bins. From these bins the ore will go to the rod mills, of which there are five. Foundations are in place for a sixth rod mill and it can be quickly installed if needed. A flexible arrangement is required for feeding from the bins to the rod mills because the three units of the flotation section are likely to handle different ores at the same time, two may handle the same ore and the third a different ore,



Concentrator Building Seen from between Thickner and Crushing Plants



Concentrator Building, Rod Mill Section

or all three may run on the same ore. It will also be desirable, at times, to mix certain ores and handle the mixture in any one or all of the three units. There are five bins from which the rod mill can be fed and five others which will be used for storage of custom ores. From the five last mentioned the ore will be carried to the rod mill feed bins by inclined belt conveyors and it will be possible to mix the ores from any or all of these bins or keep each ore separate. Each rod mill feed bin will be equipped with three roll feeders and underneath the feeders will be located short gathering conveyors which are reversible. These gathering conveyors will discharge upon the rod mill feed conveyors. The rod mill arrangement also required flexibility. The five rod mills can be used for grinding to a finished product if this is found to be feasible, or three mills can be used as primary grinders and the other two as secondary grinders. Two of the mills are equipped with manholes and can be converted into short tube mills with balls for the grinding medium. All rod mills are five feet in diameter and 10 feet long. The size of the rod mill feed can be reduced considerably if necessary on account of the liberal crushing and screening capacity in the coarse crushing department. The ores from the Bingham district need to be ground so that approximately 65 percent will pass through a 200-mesh screen and only about 2 percent remain on a 65-mesh screen. Most of the custom ores will have to be ground to about this same size, but a few will require finer grinding.

The rod mills will be operated in closed circuit with 54-inch Akins classifiers of the semi-submerged type. They will be driven by individual 100-horsepower motors connected to the mill through flexible couplings and speed reducers. The classifier overflows can be sent to the flotation circuits or to a secondary grinding circuit if it is found that two stage grinding is necessary to obtain a finished product.

The finished product from the fine grinding section will be the flotation feed and will be pumped to surge tanks by Wilfley pumps. There will be a surge tank at the head of each unit of the flotation section and the function of these tanks is to balance any fluctuations in the quantity of pulp delivered by the pumps and maintain a uniform feed to the flotation machines. The feed to the flotation circuits will contain, on the average, about 20 percent solids, a variation from 18 percent to 23 percent being allowable.

The flotation method which will be used in the mill is substantially the same as the method now being used in

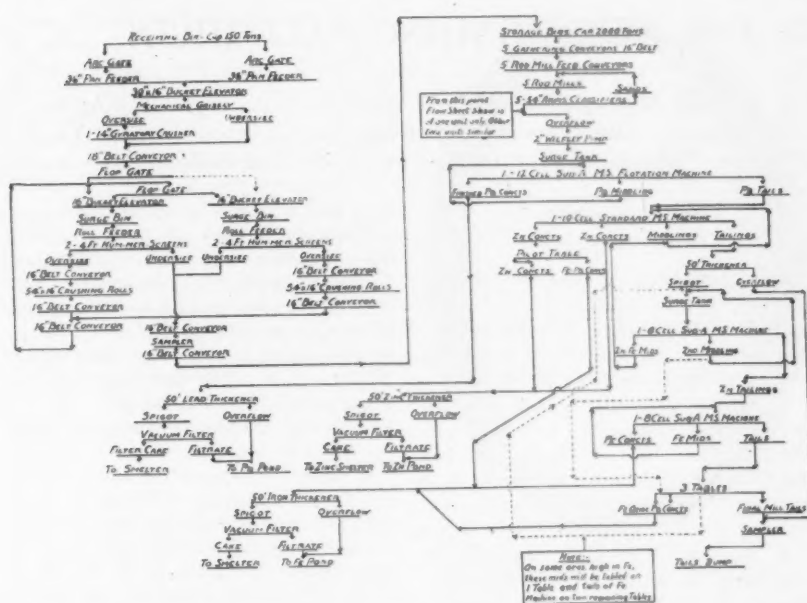
the 50-ton pilot mill which has been in operation for about 18 months and has handled a great variety of ores. Each flotation unit will contain the following machines:

- 1—12-cell, 24-inch, Minerals Separation, subaeration machine for lead.
- 1—10-cell, 24-inch, Minerals Separation, standard type machine and one 8-cell, 24-inch, M. S., subaeration machine for zinc.
- 1—8-cell, 24-inch, M. S., subaeration machine for iron.

In deciding upon the number of cells to be used in the mill it was necessary to keep in mind the wide variations in the character and metal contents of the custom ores that will be handled.

The lead product will be floated first, the zinc product next and the iron last. The flow sheet will be so arranged that ores can be milled in which any of these metals is missing. The introduction of oils and reagents begins at the rod mills where sodium sulphite, Republic No. 19-B oil and steam distilled pine oil are added. With some ores it has been found beneficial to use, in addition, sodium silicate and also sodium sulphide at this point. The quantities of the oils and reagents used depend upon the character of the ore and the metal ratios and contents. The oils and reagents will be fed into the circuits with adjustable bucket type feeders which will permit positive control and close regulation. The sodium sulphite is used for depressing the zinc mineral. When handling an ore high in zinc content it will usually be necessary to use more of the reagent than when handling an ore of lower zinc content, although the quantity used will not necessarily be proportional to the zinc content. Other factors such as the floatability of the zinc mineral must be considered. In the lead machine the following oils and reagents will be used: Potassium xanthate, Republic No. 19-B oil or Barrett No. 4 oil and steam distilled pine oil. On a few ores soda ash, sodium silicate and sodium sulphide will also be used. The quantities of oils and reagents used in the lead circuit will also vary with the ore. The finished lead product will be taken off at the head cells of the lead circuit. The number of cells that will make finished lead concentrates will depend upon the lead content of the ore being treated. On a high grade lead ore five to eight cells will make finished product and the number can be reduced to one cell for a low grade ore. The froth from the remaining cells of the lead machine will be a middlings product which will be returned to the head cell of the machine. The lead product will not be cleaned.

The tailings from the last cell of the lead machine pass to the zinc circuit entering this circuit at the head cell of the standard type M. S. machine. The reagents and oils used in the zinc circuit are as follows: Copper sulphate, potassium xanthate, Republic No. 19-B oil or Barrett No. 4 oil, steam distilled pine oil and hardwood creosote. The quantities used vary with the ore milled, but average about as follows: Copper sulphate 2 pounds, Republic or Barrett oil 4 pounds, pine oil 4 pounds and hardwood creosote 1 pound. All figures refer to the quantities used per ton of crude ore milled. The finished zinc product is taken off at the head cells of the standard type M. S. machine. The number of cells making finished product will be determined by the zinc content of the ore and the zinc-iron ratio and will vary from two to eight. The froth from the remaining cells of the standard type M. S. machine will be a middlings product and will be returned to the head cell of this machine. The tailings from the last cell of the standard type machine pass to a 50-foot Dorr thickener, which will be used both as a thickener and a conditioner, allowing the copper sulphate to have considerable time contact with the ore particles. The amount of thickening will be comparatively small. The thickener feed will contain approximately 14 percent solids and the spigot about 22 percent solids. The thickener spigot product will be pumped by a Wilfley pump to a surge tank and from this tank it will pass to the head cell of the 8-cell subaeration zinc machine. The froth from the head cells of this machine will be a middlings product and will be combined with the froth from the middlings cells of the standard type machine and returned therewith to the head cell of the standard type machine. This combined middlings product is called the first zinc middling. The number of subaeration cells making this product will be governed by the zinc and iron contents of the ore. The froth from the remaining cells in the subaeration machine will be the second zinc middling and will be returned to the head cell of the subaeration machine. By this method of treatment the grade of the finished zinc product can be built up even when a large percentage of pyrite is present, which will be the case with probably 85 percent of the ores milled. There will be no actual cleaning of zinc concentrates. The tailings from the last cell of the subaeration zinc machine will pass to the iron circuit which consists of one 8-cell, 24-inch subaeration machine. This machine will make a finished iron product and the final mill tailing. This machine will be operated in a manner similar to that used on the lead machine. With ores containing lead



Flow Sheet, 500-Ton Flotation Mill, United States Smelting Co., Midvale, Utah

carbonate part of this mineral will be recovered with the iron. Sodium sulphide is usually the only reagent used in the iron circuit, although on some ores it has been found beneficial to use soda ash, Republic or Barrett oil, or a small quantity of steam distilled pine oil. The tailings from the iron circuit will be sent to Deister-Plato tables. These tables will be used primarily as pilot tables, but they will also recover some pyrite and oxidized lead mineral. The froth from the first two or three cells in the zinc circuit will also be sent to pilot tables to enable the flotation operator to keep a close check on the work of the zinc machines.

All flotation machines will be gear-driven. The line shaft which drives the impeller shafts will be connected to the motor through a gear speed reducer and flexible couplings.

The flotation concentrates will be sent to 50-foot Dorr thickeners and then to American filters in accordance with standard practice. The filters will be located directly over the concentrates bins and the bins directly over the concentrates loading track. With this arrangement it will not be necessary to handle fine concentrates on conveyors. The bins will be equipped with large doors in the bottom and these can be either left open or closed and the filter cake can be allowed to drop directly into railroad cars or retained in the bins.

The three Dorr thickeners used for thickening the concentrates will be housed in a building along with the three Dorr thickeners used for thickening and conditioning the zinc mid-

dlings. The thickener mechanisms are supported by the building trusses and do not rest on the redwood tanks. The thickener tank floors are reinforced, water-proofed concrete with a slope parallel with that of the rakes. Under each tank is a tunnel with walls, roof and floor built of reinforced, water-proofed concrete and all tunnels are of ample size to permit an attendant to stand upright and do any necessary work on valves or pipes. The floors of the tunnels slope toward sumps and these sumps are equipped with automatic sump pumps. Any spills in the tunnels resulting from the choking of pipes or spigots can be washed into the sumps and the pumps will automatically start and pump the spillage into the thickener from which it came. The density of the concentrates thickener spigot products will be controlled by diaphragm pumps and that of the conditioning thickeners by varying the size of the spigot. The thickened concentrates will be pumped to the filters by Wilfley pumps and the thickened and conditioned middlings will be returned to the zinc flotation circuit by similar pumps. All of these pumps are direct connected to motors. The finished lead, zinc and iron products from the three flotation units are handled, respectively, in the same thickeners because there is no advantage in keeping the respective finished products separate.

The Wilfley pumps which will deliver the flotation feed from the Akins classifiers to the flotation circuits will all be direct connected to motors. There will be five of these pumps and they will be located in a long, reinforced concrete pit

which runs the full length of the rod mill and classifier section. The pit will be divided into three sections, one for each unit, and all spills from pumps, rod mills, or classifiers that may accidentally occur can be confined to the unit from which they came. Each pit section will be provided with a sump and automatically operated sump pump similar to those in the Dorr thickener tunnels and any spillage will be returned to the proper circuit by these pumps.

The floors in the flotation section will be provided with drains leading to a long pit. The floors as well as the pit will be divided into sections by curbs so that any accidental spills from the different circuits will not become mixed. The pit will be provided with sumps and automatically operated sump pumps in a manner similar to that used in the rod mill pit. It is important that the spills from the different flotation circuits are kept separate. If spillage from the zinc circuit, where copper sulphate is used, should become mixed with that from the lead circuit and returned therewith to the latter circuit the zinc would tend to float with the lead. In a similar manner any spillage from the iron circuit would cause trouble in the zinc circuit.

The overflows from the three concentrates thickeners will go to three ponds, one for each product, and the filtrate from the filters will go, respectively, to these same ponds. It is not expected that, under normal conditions, there will be any appreciable loss of product either in the tank overflows or in the filtrate and the ponds will be used merely as a safety measure.

The flotation oils and reagents, with the exception of the copper sulphate, will be introduced into the mill circuits by means of special bucket type feeders. These feeders are so designed that the quantity of oil or reagent, delivered at the point of introduction, can be varied between wide limits and will not be affected by the viscosity of the liquid. All reagents used are either water soluble or miscible with water and will be fed in solution. The copper sulphate is added at only one point in each flotation unit and will be introduced as an overflow from a small copper tank which will be kept nearly full of the solid salt and into which a small stream of clear water under constant head is kept running. All other reagents will be dissolved in tanks equipped with mechanical agitators. These tanks will all be on the same floor and each will hold at least 24 hours' supply. The arrangement for handling the reagents will be such that the containers can be carted from the warehouse floor directly to a platform elevator, elevated to the tank floor and emp- (Continued on page 626)

RUBBER LININGS FOR WET GRINDING BALL MILLS

Grinding Cost Is Largest Item In Average Milling Operation—Therefore Improvements Which Indicate Lower Consumption, Maintenance And Increased Efficiency Are Of Great Interest To The Operator Who Wishes To Show Substantial Margin Between Cost And Selling Price

By B. W. ROGERS *

THE chief aim in modern industry is to maintain quality and reduce production cost which stimulates research along the lines of improved process methods and materials. The operator primarily interested in commercial production does not often have the opportunity to enter into research activities, but nevertheless should be ever on the alert to investigate and adopt and, if possible, improve those methods and materials already within reach.

In the average milling operation, grinding cost is the largest item, therefore, improvements in this branch which indicate lower power consumption and maintenance and increased efficiency should be of significant interest to the operator who tries to show the greatest possible margin between the cost and selling price of the commodity produced.

It has been known for some time that a good grade of rubber has a remarkable ability to resist abrasion and special study has been given to the compounding of rubber for various abrasion resisting service. For those who are not familiar with this quality of rubber, the example of the automobile tire and skid chain is convincing; all those who have used skid chains on their motor cars know that the links, which are made of hard alloy steel, will wear to a point of failure when exposed to bare brick or concrete pavement in a few hundred miles, while the tread of a good tire will travel thousands of miles, absorbing abusive impact and friction without showing any appreciable signs of wear.

EARLY TESTS

In 1921 Mr. J. J. Denny, who was at the time Superintendent of the Nippissing Mines at Cobalt, Ontario, Canada, conceived the idea to use rubber as a grinding mill lining as a means to alleviate excessive steel consumption in the grinding mill operations. Tests soon indicated that the wearing quality was favorable and that the rubber lining could compete with iron and steel. Further tests were made and observations were turned to other factors of performance such as the effect on power consumption and

grinding efficiency. A close check demonstrated:

1. That the change to rubber lining had increased the capacity of a 4-ft. by 20-ft. mill by at least 15 percent.

2. That it was possible to cut out one of the three preliminary grinding mills entirely after the secondary mills had been lined with rubber. When the same procedure had been tried formerly, the secondary mills soon became overloaded.

3. That the slippage of balls against the shell lining was substantially reduced.

4. That the consumption of grinding media was 8.8 percent less per ton of material ground after rubber lining was installed.

One of the large rubber companies became interested in the possibilities of the lining and inaugurated a test program to demonstrate the adaptability and limitations which included a review of available information regarding the basic principles governing the performance of grinding mills under varying conditions.

GRINDING MILL THEORY

In the operation of rotary grinding mills, into which class falls the ball mill and tube mill, certain well-defined laws are recognized and by application of these laws it would be possible to con-

trol and maintain a mill at peak performance if it were not for the variable factors which enter into the grinding equation, namely—1. Feed size; 2. Feed dilution; 3. Size and shape of grinding media; 4. Weight of grinding charge; 5. Shape and thickness of shell lining; 6. Mill speed. The ball path and ball cycle within the mill is the most important factor having influence on power consumption, capacity and efficiency. The factors governing the ball path are speed and slippage. Slippage being variable, its elimination brings a closer control on the mill. The variations depend upon the volume of the mill occupied by ball charge and the shape and surface of the shell lining and the nature of the product being ground.

Balls making up a charge within a mill rest at a critical angle as the mill is revolving slowly and as the charge is tilted to approach a critical angle the balls leave their position of rest in relation to the rising load and roll down the slope to the lower side of the mill. Increase of speed brings more balls to the top and consequently more falling into the active zone, and one of the principal factors governing the efficiency of any mill is the ability to produce the maximum number of cycles of the ball charge per minute without centrifugal force entering into the action to the extent of throwing the balls out as individuals which eliminates contact, which is the basis of the grinding action. It has been determined that at the critical operating speed of a mill charged half full of balls any particular ball will roll down the incline something less than twice per revolution, and also that each revolution of the mill will produce 1.44 cycles of the charge, assuming, of course, that all slippage between the shell lining and the grinding media is eliminated.

LABORATORY TESTS

In the laboratories of the B. F. Goodrich Company a test mill was set up, consisting of a revolving cylinder 16 inches in diameter by 5 inches long, with a plate-glass front and convenient means of changing speed. The object of the test was to determine the ball action under a number of conditions. Tests were made using flat steel lining, flat rubber lining, and wave



Model Ball Mill With Variable Speed Drive. Used for Photographic Study of Ball Action in Connection With Experiments With Rubber Lining

* B. F. Goodrich Rubber Company.

rubber lining. Ball charges were varied by tenths from .3 to .6, inclusive. The different charges and linings were operated dry, wet with water, and in contact with slime. The finely ground pulp obscured the action but indicated increased slippage over the clear-water operation. To create a very slippery condition such as is produced in grinding of slime, soap was added to give the desired effect in the operation. All tests were repeated and observed at 22, 36, 48 and 60 R. P. M. In order to keep a permanent record of the tests, a series of more than 100 photographs were taken, which allowed a very interesting study by comparison.

It was found that three types of linings when operated dry showed the same results as closely as could be detected, indicating that in the dry grinding mills slippage of balls occurs only to a slight degree regardless of the shape and material of the lining. At low speed the agitation of the grinding charge is very limited as the mass spends most of its time in the upward path wherein there is little action. The effective grinding zone traveling in the downward path is comparatively smaller at low speeds.

When the grinding charge in the test mill was submerged in water slippage became very evident on both the smooth rubber and smooth steel linings, but to a greater degree on the steel lining. This slippage was reduced to some extent by increasing the volume of the charge. After soap was added to the water the condition in the mill became so slippery that the balls seemed to remain in the stationary position regardless of the speed, and it was evident that slippage was less on the smooth rubber than on steel. Further comparisons with the ball charge submerged in soap and water and operating with wave-type lining showed so little slippage that the photographs were very similar in appearance to those of the dry operations, where slippage did not occur. From the laboratory tests it was concluded that the slippage of the grinding media on the shell lining decreases as the volume of the charge occupying the mill is increased. Slippage is very slight in a dry condition regardless of the shape of the lining. That slippage becomes evident in wet operation and increases with the slipperiness of the material fed to the mill; that slippage on smooth rubber is less than on smooth steel; that wave rubber reduces slippage to a minimum even under extremely slippery conditions.

ACTUAL OPERATING TESTS

In order to check the information obtained through the laboratory testing program,

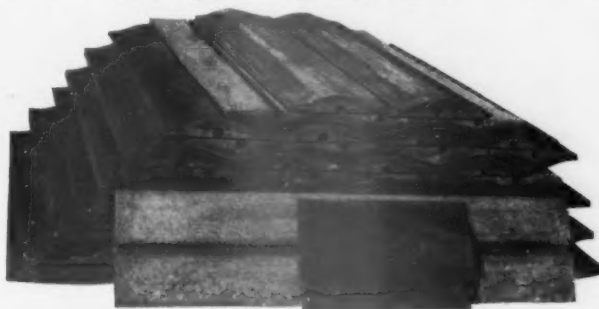


Wave Type Rubber Lining Installed in 5-Foot Diameter Ring Representing Section of Tube Mill Shell. Attachment Is Made by Means of Three-fourths-Inch Bolts, the Heads of Which Are Anchored in the Slots of the Metal Inserts, Which Are Integral Parts of the Lining

tests were continued in large mills in actual operation. A plant was selected where there were operating six 5 ft. by 22 ft. mills, all working in parallel and taking their feed from a common source. No. 1 unit was lined with rubber and No. 2 unit was lined with chilled iron liners of about 2-inch average thickness. Tests included a ball charge variation from .3 to .5 of the volume occupied, also the speeds were varied and observations were made at normal speed, 27 R. P. M., and reduced speeds at 24.4 R. P. M. and 22.7 R. P. M.

Various readings were made at frequent intervals in order to obtain a record of moisture content and screen analysis of the feed and discharge. The discharge was measured by volume so that the capacity in dry tons could be figured. The following conclusions were drawn from the tests in actual operation:

1. Slippage evident with low ball charges diminishing with increase of charge up to .5 of the mill volume.



Complete Wave Type Rubber Lining for Shell of 5 x 22-Foot Tube Mill; Weight 4,200 Pounds. Steel Liners of Same Shape and Thickness Would Weigh 23,500 Pounds

2. Efficiency increases as slippage decreases.

3. Ball charges in excess of .4 gives flat rubber lining an efficiency advantage over flat steel lining.

4. Speed reduced below 27 R. P. M. reduces efficiency.

The following is a representative test of the operation of No. 1 and No. 2 mills:

	No. 1 mill, rubber lined	No. 2 mill, iron lined
Dry tons per hour.....	9.76	8.15
K.W.H. per ton.....	13.5	14.88
Fineness through 200 mesh. 94.1		93.2

Speed, 27 R. P. M. Ball charge, .45 to .5 volume. Duration, six hours. Moisture content of feed, approximately 35 percent.

WAVE TYPE RUBBER LINING

The advantages of a corrugated iron or steel lining, such as the wave and step lifter types, have long been known and are preferred to flat linings. The principal objections to corrugated metal lining is the wear concentrating at the convex portion, reducing the whole to a flat lining long before the ultimate life is reached. During the progress of experiments wave rubber lining was developed, having in mind the advantage of the shape, also standardization in design and means of positive attachment to the shell with all metal eliminated from wearing contact. Wave type rubber lining was installed in one of the units and tests were resumed to compare the results of the wave type with the flat rubber and flat iron linings in No. 1 and No. 2 units. By extending lights into the trunnion of the mill it could be observed that slippage was reduced to a minimum, in comparison to the other two mills under observation. In taking an average over a number of tests made it was found that the K.W.H. consumed per ton of dry feed ground in the wave rubber lined mill was approximately 17 percent lower than in the iron lined mill, and in a few tests the K.W.H. consumed per ton dry were in excess of 20 percent for the iron lined mill. It was observed that the rubber lining made the operation of the mills almost noiseless and reduced the power peaks, as evidenced by a reduced fluctuation of the ammeter.

Study of the resulting data from tests with the wave rubber shows that the efficiency of the mill in terms of K.W.H. per ton was practically uniform with charges ranging from .3 to .5. This was contrary to the results with the flat linings which showed increase in efficiency with increase of ball charge. This result indicates that a wave rubber lined mill can be operated at a maximum efficiency with a low ball charge and will

result in a greater degree of flexibility in operations where maximum capacity is not required and in mills where the construction and drive arrangement are not adequate to accommodate ball charges greater than .4.

POWER SAVING

The most consistent indication throughout the entire test program was the power saving of the rubber lined mills compared to the iron lined mills. One test was started with equal ball charges of 36,300 pounds and the wave rubber lined mill showed about 20 percent saving in power consumption. Balls were added to the rubber lined mill until the power readings on both mills were equal. Equalization was reached when the charge in the rubber lined mill had been increased to 45,000 pounds or a difference of about 9,000 pounds. The power saving in favor of rubber lining is very evident but the reasons for this saving are not entirely explainable. The saving is no doubt due to several contributing factors. The most important is the reduction of slippage of the grinding media which eliminates to some extent the back surge of the entire grinding charge. Power saving is attributed to this lessened slippage which causes a power peak at each surge and excess power to again accelerate and lift the charge. It is also believed that the lessened weight at the periphery of the mill which is credited to the lightness of the rubber lining, contributes to reduced power consumption.

OBSERVATIONS OF WEARING QUALITY

One of the first installations made was of the flat type which consisted of flat sheets which were cured with a thin piece of gauze netting between the press and the surface which left a slight imprint on the rubber. After 90 days continuous operation the wear was so slight that it had not removed this imprint. On July 1, 1925, 14 months after the installation, one of the sections of the rubber was removed and very carefully calipered at a number of different points. At no place was the wear in excess of 1/64 inch.

ADVANTAGES OFFERED IN USE OF RUBBER LINING

Steel linings in the same shape and thickness of wave type rubber lining show a difference in weight of about six to one. In some cases where iron and steel liners approach 3-inch average thickness, this differential is in excess of ten to one. This difference in weight reduces the revolving dead weight on the trunnions and allows the difference to be made up in effective grinding charge. Long life and reduced weight effect a substantial saving in transportation cost which usually

increases in proportion to the isolation of the location where the material is used.

It has been found that in most cases the first cost of rubber lining is high in comparison to iron, steel or stone linings. However the data which is available indicates that the rubber lining can compete favorably with other types of lining on a cost and service basis.

MAGNESITE POSSIBILITIES

METHODS of making satisfactory plastic magnesia, used extensively in the manufacture of stucco and composition flooring, from the magnesite deposits of the Western States have been developed as the result of an investigation conducted by the Bureau of Mines. The investigation also revealed that plastic magnesia of fair quality could be produced from dolomite, a material cheaply obtainable in the Eastern States, where the market for plastic magnesia is largest. The experimental work of the Bureau of Mines was conducted with magnesite from Washington and California, with the view of aiding American producers in establishing a domestic industry to compete with material heretofore largely imported.

The big centers of consumption of plastic magnesia are in the Eastern States, whereas the only producing districts of the country are in California and Washington. On the other hand, large supplies of good dolomite are available in the East and the Bureau of Mines tests have shown that recarbonated dolomite makes very satisfactory stuccos. Dolomite does not contain enough magnesia for flooring cements. However, since 80 percent of the plastic magnesia sold is used for stucco, recarbonated calcined dolomite could satisfactorily supply most of the demand for plastic magnesia.

Research undertaken to show the suitability of Washington crystalline magnesite for the manufacture of plastic magnesia, while accomplishing its purpose definitely and satisfactorily, incidentally discovered a process for using dolomite in magnesian mortars which may well prove commercially important. This discovery indicates a use for vast deposits of pure dolomite near eastern consuming centers and may revolutionize the magnesian mortar industry.

The results of this investigation are contained in Bureau of Mines Bulletin 236, "Plastic Magnesia," by Oliver C. Ralston, Robert D. Pike, and Lionel H. Duschak, copies of which may be obtained from the Superintendent of Documents, Washington, D. C., at a price of 30 cents.

NEW FLOTATION MILL

(Continued from page 623)

tied into the tanks. From the supply tanks the reagents are distributed to the various feeders by means of a system of pipes. The steam distilled pine oil, Republic oil and Barrett oil will be pumped from 12,000 gallon receiving tanks to supply tanks on the same floor with the reagent supply tanks. The hardwood creosote will be handled in a manner similar to that used for reagents. The quantity used of this oil will be so small that a large receiving tank was unnecessary. One barrel will last four or five days.

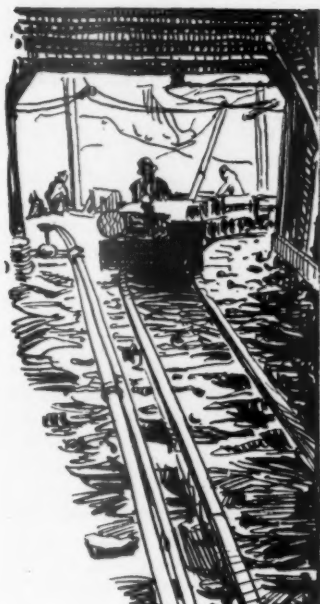
All launders in the mill will be of the non-splash type, built of redwood and lined with rubber.

The mill water supply will be taken from the company's canal which also supplies the smelter and the present gravity concentrator. This water comes from the Jordan River. The water will be pumped from the canal to the mill supply tank by two 6-inch centrifugal pumps direct connected to 35 horsepower motors. Each pump has ample capacity to supply the entire mill. The supply tank, which has a capacity of 40,000 gallons, is located on a tower tank about 90 feet above the flotation machine floor so there will be ample pressure for all purposes except fire protection. A high pressure system for fire protection connected with the smelter system has been installed.

The lead and iron products from the mill will be sent to the company's lead smelter, situated about 400 yards from the mill, and the zinc product will be shipped to a zinc plant.

The products from company and custom ores will vary widely because the character as well as the grade of these ores will vary. The recoveries of the metals and the grade of the products will be affected by the amount of oxidation that has taken place and the relative flotability of the minerals.

The work of the Petroleum Division of the Bureau of Mines has been of direct value to the oil industry, according to a report of the subcommittee of the advisory committee to Secretary of Commerce Hoover on reorganization of the Bureau of Mines. It is recommended that the field work of the Bureau in the study of operating methods be continued by cooperation of the industry through advisory committees. The committee says that studies of the physical and chemical character and properties of oil have not been thorough or systematic. It is recommended that this work be concentrated at a central point and confined to scientific research rather than development of new processes or improvement of existing practice in the refining



COAL

PRACTICAL OPERATING MEN'S DEPARTMENT

*Practical Operating Problems of the
Coal Mining Industry*



MECHANICAL LOADING IN CENTRAL PENNSYLVANIA

The Writer Of This Paper Believes That In Spite Of All Handicaps A Large Percentage Of Our Coal Will, Within A Few Years, Be Loaded Mechanically—He Points Out Three Major Items To Be Overcome Before Universal Use Of Loaders Is Possible

By O. G. SHARRER*

LOADING mechanically has become the most widely discussed subject in connection with coal mining and has even equalled the discussion of safety measures as a topic of interest. It would appear that all has been said that can be said until further experiments bring out new lines of discussion. It is, therefore, not the intention to present this article as a technical discussion of the subject of mechanical loading as a whole, but rather as a plain talk on machines with which the writer has had personal contact.

In 1919 during the first period of post war depression, a Pennsylvania coal company became interested in the possibilities of mechanical loading. Of several loaders presented for their consideration the model of the Joy loader seemed to hold the greatest possibilities and after extended study the management decided to invest in a machine of this type. A machine was built, which as far as the writer knows was the only one of its type ever put on the market. This machine arrived at one of the mines early in 1920 and was put to work immediately. It was a forerunner of the present 4BU and 5BU types, but differed from them very radically as to design. This machine was very efficient and from our experience was worth retaining, but has been abandoned by the

Joy Company on account of its making the machine unwieldy.

The whole machine was mounted on caterpillar tractors which were driven by two 10 H.P. Westinghouse series wound motors, each having its own controller, the controllers being arranged in tandem so as to be operated by the same handle. This very ingenious scheme which is shown in Figure 4 was supposed to make it possible to steer the loader by the controllers. By swinging the handle one way both motors moved forward, by swinging the handle the other way both motors moved backwards and by twisting the handle as shown by arrows, one motor moved ahead and the other back thus causing the machine to turn. This scheme proved a failure as the loader was too temperamental and erratic in its operation. This system never proved satisfactory and was abandoned for the present "Flivver differential" which is much better but not altogether satisfactory. Since the Pennsylvania law does not allow any wiring within rooms, the machine had to be equipped with a special General Electric cable reel holding 350 feet of duplex cable. This reel was driven by a separate motor of standard General Electric pattern, in fact it was the same as that on the standard Gen-

eral Electric gathering locomotives but about twice the usual size. The gathering arms, conveyors, oil pumps, etc., were operated by a Westinghouse 22 H.P. compound wound motor which drove the different moving parts through jaw clutches. This motor was installed under the forward conveyor and was the most complete job of making a thing inaccessible that the writer ever encountered. We shot a field coil on this motor and it took six skilled men about sixteen hours to change it. Summing up, the machine had four motors, four controllers, four separate rheostat banks with three jaw clutches, was 22 feet long, 8 feet wide and 4 feet 8 inches high and weighed six tons.

In order to make the following discussion clear, I have prepared a plan of the Central Pennsylvania system of mining which has been perfected by the coal company referred to, and since it has proven to be the most economical and safe system so far devised for this particular coal field, the company insisted that the Joy machine should be operated under this system with some minor changes.

In order to give a clear explanation of the Central Pennsylvania system of mining, it is necessary to state the various problems met in mining the seams of this field. (1) A large portion of the coal is mined for a by-product coking process plant, and since coal which

* Engineer, The Union Pacific Coal Co.

stands for any length of time in pillars is not suitable for coking in by-product retorts, it is necessary to have a plan which facilitates rapid recovery of pillars. (2) The surface is agricultural land and very valuable and as there are four workable seams in this field, this condition requires a system that will cause the minimum of damage to the surface as well as an even distribution of weight in worked out areas, so as to facilitate later mining of the deeper seams. (3) The seams are all gaseous and as the coal is low the area opened soon becomes extensive, causing very long airways. This condition makes an unusual number and size of airways necessary. (4) Pillar areas give off considerable gas and the Pennsylvania law requires that these areas be very thoroughly isolated from intake air currents. (5) All haulage is mechanical, no horses or mules are used in any of these mines.

The Pennsylvania system meets all these problems very nicely and also allows concentration of work as well as economy in equipment.

The general outline of the system may be described briefly as follows:

Five main headings (this being a requirement of the state law) are driven in on the full dip of the seam, which averages four and one-half percent. This gives three intakes and two returns, one intake being used for haulage and two as traveling roads. All headings are driven on 40-foot centers regardless of cover. Main Flat headings are turned on either side at 1,500-foot intervals, thus allowing space for 33 rooms and the necessary barrier pillars between each pair of main flats or entries; 250 feet of solid coal is left to protect main entries before turning a butt or panel heading, and the rooms are turned inby on the first pair and outby on the second, thus giving a large breaking area for the first roof break. This also permits the leaving intact of the first pair of butt headings on either side of the main, these headings being made a part of the main return air course as soon as the room coal is entirely removed. This gives a total of six 6 x 10 foot return airways at no additional expense for rock yardage. This ample return area accounts for the low-water gauges obtained at these operations. Additional butts or entries are turned at 265-foot intervals from the No. 2 butt on either side of main entries or slopes, and the rooms are driven through the chain pillar of the butt outby, thus eliminating the difficulty which is always encountered in removing a chain pillar on the double-entry system. Each butt is overcast and on a separate split, No. 1 Room driven 15 feet wide on each butt is left intact and acts as a return when the butt is finished. This gives two in-

takes and two returns for each Main Flat.

Figure 2 shows this system, but does not show all the experiments we made with track layouts. Our experiments with track layouts taught us that there is no particular advantages in a complicated system of track, as the expense of laying and repairing eats up the profits that might accrue due to greater speed in handling cars. The final system for handling cars is shown in Figure 2, which we will refer to as "Car handling for Joy loaders." This plan was very efficient, and with a 3-ton battery motor we could easily handle 20 cars per hour over any of our room distances. Our largest hour's loading during the entire period of experimenting with this machine was 38 cars, and we had no trouble in maintaining this speed. Our mining conditions were as near ideal for mechanical loading as it would be possible to imagine. Good roof, needing no timber near the face, hard bottom, practically flat seam, absolutely clean coal not less than 5 feet 6 inches and never over 6 feet in height. The coal was of the coking variety and very fragile, which made it easy to load after being properly shot. Yet the loader proved to be a failure on account of mechanical defects which ran the maintenance cost up very high. Our average loading per day for the entire period was 71 tons, the largest hour was 38 cars which ran about 70 tons, but when charges for interest, depreciation and power were added the cost was excessive. After experimenting with this machine for two years and after spending a large amount of money from which they never received any return, the management decided to abandon the machine and all heaved a sigh of relief. In justice to the Joy machine it must be admitted that the plan of construction was very clever but an idea no matter how clever will not load coal alone; such must be incorporated in a sturdy, practical machine which can be operated and repaired by the ordinary run of labor found around the coal mines. These qualifications were lacking in the pioneer Joy machine just as is the case with all new development.

When the Joy machine was installed in 1920 the Goodman Machine Company which had furnished the greater part of the coal company's mining equipment, offered to install a scraper loader for trial. This machine was put in an area which it had not been practical to mine by hand methods as the coal was only 30 inches in height. This machine has been very widely discussed, therefore no attempt will be made to describe it in detail, sufficient to say that it is the simplest so-called loading machine on the market and the maintenance on it amounted to much less than on a stand-

ard cutting machine. This machine was, however, not a success when used on the room and pillar system, where rooms could not be driven over 24 feet in width. There can be no track laid in the room with the scraper and this necessitates roping the cutting machine on the bottom. In dragging a heavy cutting machine over the floor, the bottom becomes broken up and fine coal and bottom rock are ground up together. The scraper also tears up the bottom and this dirt is gathered up with the clean coal when the scraper is coming out of the room. This ruins the efficiency of the cutting machine as the time taken up in roping from one place to another is nearly double the time required to cut a place. In fact, two wide rooms was a shift for a machine crew, while under the normal plan they will cut 10 and 12 wide rooms. Furthermore, pillars cannot be removed with this machine and if the room must be tracked and the pillar removed by hand the profits gained by mechanical loading vanish. These defects uncovered themselves early in the operation of this machine and different schemes were tried until the plan we named "panel wall" was finally evolved. The figures showing panel walls system give an idea of how this works and shows you that it is a radical change in system being a variety of modified longwall if one may use this much abused term. This system is applicable only under certain fixed conditions and bears no relation to the "V" or other systems which are supposed to revolutionize coal mining no matter what the height or pitch. It might be well here to state that longwall bears a very evil reputation here in America but this reputation is unmerited. If we study all the conditions, including height of coal, amount of waste, condition of floor, thickness and composition of cover and more especially uniformity of cover as well as the regularity of working periods and then try longwall only where our judgment tells us it can succeed, we will have success with this system in America. In longwall work we attempt to produce exactly the opposite effect to what we desire in room and pillar. That is, we try to throw the mine on squeeze and if we can do this our longwall will work. In our particular case this was easily done as the bottom heaved easily and by placing a few cribs at the proper intervals to transmit the roof thrust to the floor we could start this condition at will.

Now to describe how we loaded this coal. The panel headings were driven 16 to 18 feet wide and brushed to a total height of 6 feet, this rock being packed very carefully along the rib as it had a very important duty to perform later. We tried both top and bottom brushing and found that while the bottom brush-

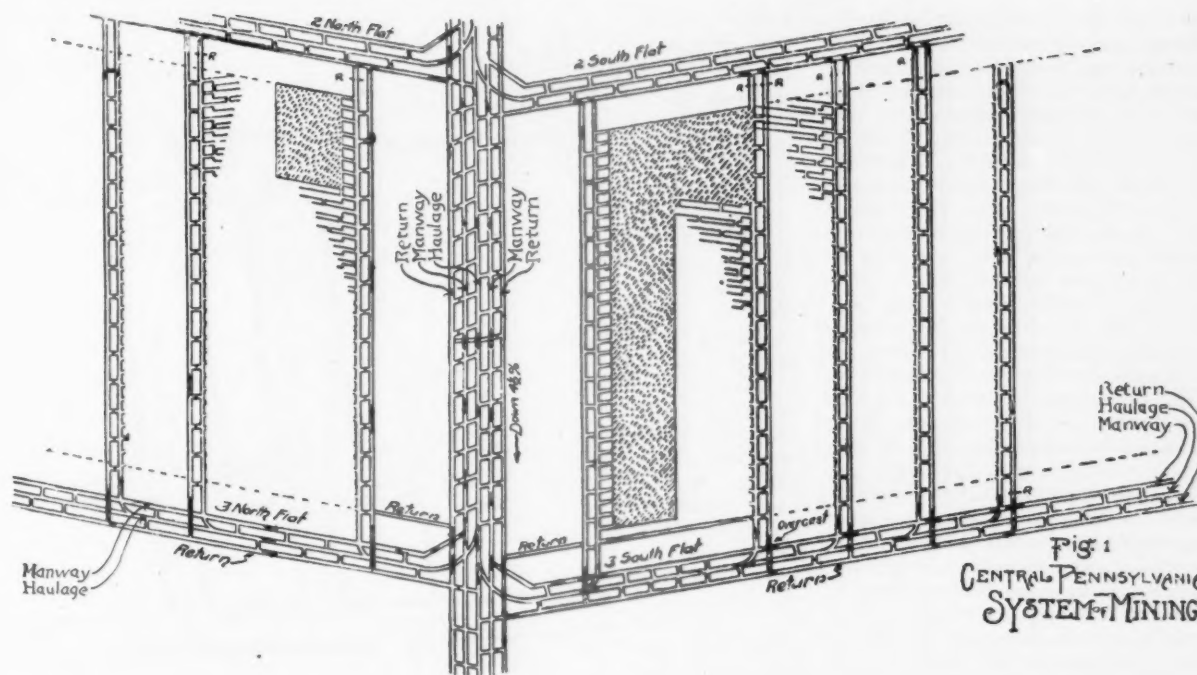


FIG. 1
CENTRAL PENNSYLVANIA
SYSTEM OF MINING

ing cost slightly more and did not give such good building material it gave much better results in the end. Roof brushing cuts a notch in the roof and thereby increases the tendency of the roof to break along the packs, as those who have had experience with longwall can testify. Bottom brushing puts the loading apparatus well above the pit car, and this is more of an advantage than one would think. We finally standardized on bottom brushing for the reasons given above.

The face opened, the procedure was as follows: The loading apparatus, that is, the boom, motor, etc., was taken off the truck and mounted on a plate and remained with that face during its life, moving ahead just the cut depth each time. The faces averaged about 275 feet and the entire face was undercut about 4 inches above the bottom by a Goodman 112 E.B. machine with a 7 foot 6 inch cutter head. Each face threw slightly over 200 tons and was cut, shot and timbered on the night shift, thus assuring the loader of 200 tons of coal for each shift. The plan and elevation shows conditions in the face during loading, and I believe very little explanation is needed. To explain the 4-inch bottom coal matter may, however, be necessary. We left this coal in order to get away from the trouble from dirt when the scoop slid directly on the floor. As this coal is very free from the bottom this coal came up very easily and was thrown in the way of the scoop by the face men as the cleaning of the face advanced. The back timber was drawn when each new row of props was set, as is the usual custom

in ordinary longwall work. Very little shooting was required after the face was once properly opened, as the advancing weight usually brought most of the coal down, and the few shot holes drilled were drilled with an ordinary breast auger as all this coal drills very easily. Our experiments with this plan of mining were extensive enough both as to time and quantity of coal handled to prove that the system was economical and practical. No difficulties arose which could not be overcome by exercising a reasonable amount of ingenuity, and it was apparent that as the system developed new ideas and improvements could be adapted. Our costs for loading, taking everything chargeable to this operation including interest, depreciation, upkeep, etc., were below the hand-loading costs. Remember that this was in coal which was not minable by ordinary hand methods. There were also other economies of which we were not in a position to estimate the value, but could see that they would amount to a good substantial sum. For instance, no room rails are needed, no room switches, timber waste is cut to a minimum, ventilation is much simplified, no canvas being needed, and inspection is made much easier on account of continuous faces. This system, however, was not adopted by the company for the following reasons: It meant adapting this modified longwall in mines that were primarily laid out for room and pillar. Longwall requires steady operation, that is, the face advance must be regular, not by fits and starts as the market conditions demand in that particular field. This bed of coal (the

lower Freeport) is a high-grade by-product coking coal for which there has been no market for some time and it was not the desire of the company to sell this coal on a cheap steam market. It meant a large capital outlay to work this plan systematically as a mine would have to be put in shape for it and at least five of the machines installed. Last, and most important, it was not then possible on account of the attitude of labor to get any kind of scale for this plan. The miners did not like the introduction of the "Mechanical Hungarians" and we were forced to go outside the industry to get machine operators that would give the machines a fair deal.

While we were experimenting with these loaders we encountered conditions in rock brushing in one mine which got us into another series of mechanical loading difficulties which showed that while a machine might give good results under one set of conditions it would be a complete failure if the conditions were slightly different. The upper Freeport seam varies from three feet to four feet in height in this field and since headings must be six feet in height the amount of rock to be handled is very large. The excessive cost of yardage also made it very difficult for these mines to operate on a poor market and some attempt had to be made to cut this cost if these mines were to operate. At this time the company had a Myers-Whaley machine in operation at one mine, loading out fallen rock in an old roadway which they were cleaning up preparatory to double tracking a portion of their main haul-

age. Everyone who saw this machine in operation was immediately converted, for it loaded cars faster than they could be gotten to it. Here was the solution to our rock troubles without going any further. We would get Myers-Whaley loading machines and shoot and load this rock on company time, and thereby effect a substantial saving on our rock yardage cost. Figures based on the performance in this mine showed that we could do this for about one-half of the scale price, but we soon proved to our own satisfaction that "figgers don't mean anything." The rock on which we based our figures was well-weathered and broke easily, our rock was fresh from the solid and shot in large flat slabs. Now, the Myers-Whaley, or any other loader, for that matter, will not pick up a flat slab unless it is very small. This meant sledging up the slabs while the loader was idle. Our standard rock drill was the Fort Wayne and we found no practical method of using this machine on the top of the rock pile which we had to do in order to keep rock shot sufficiently far ahead of the loader. This loader does not clean snug on the floor, but leaves three to four inches of material across the place. This had to be cleaned up before the track could be laid. All in all, it cost slightly over double the scale price when everything was figured. We had to abandon this idea as impractical, although for slightly different conditions this machine will give excellent results. We later put this machine on the coal in another mine where conditions were ideal and it has been giving good service and is showing a substantial saving in cost over hand loading. However, this profit is more apparent than real for the following reasons: It is not practical with this type of loader to drive crosscuts, this means that crosscuts must be shoveled by hand which is very expensive. It requires a more or less complicated track system. We used the plan described for the Joy machine. You cannot remove pillars with this machine which means that this track must be rearranged and the pillar removed by hand. Taking all these factors into consideration, I am sure that the machine showed little, if any, actual saving. This is a very essential point to consider in the installation of any kind of loading machine. That is, does it complete the entire mining operation or does it simply perform one step and leave other steps to be finished at a serious disadvantage? This completes my account of machines with which I have come in close contact and during this period the company experimented with some other types of machine which I will touch on briefly.

The Jeffrey heading machine was tried in one mine and discarded for the follow-

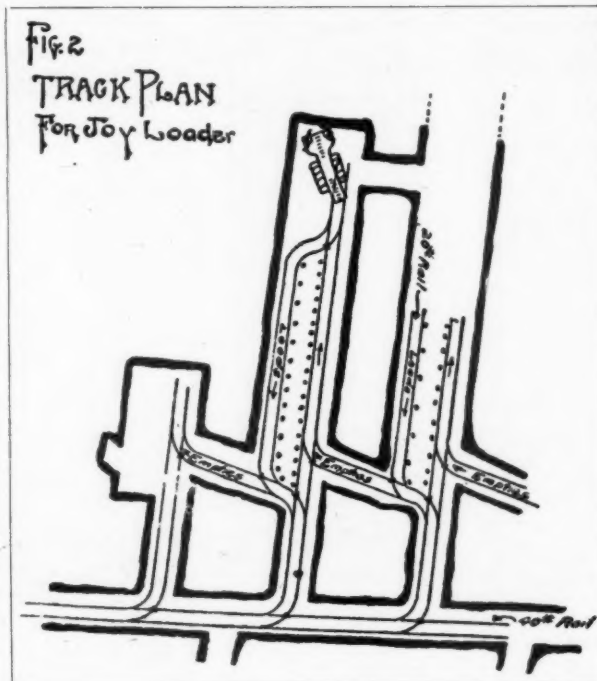
ing reasons:

First, it was impossible to keep crosscuts up to the progress of the machine as they had to be driven by hand. This was a very serious defect, in fact enough to condemn this machine in mines generating gas, as this mine did. It was absolutely impossible to load clean coal, as the bone band 4 feet off the bottom, and occasional bottom rock when machine ran into bottom, was all ground up very fine and was loaded into the pit car. It made a tremendous

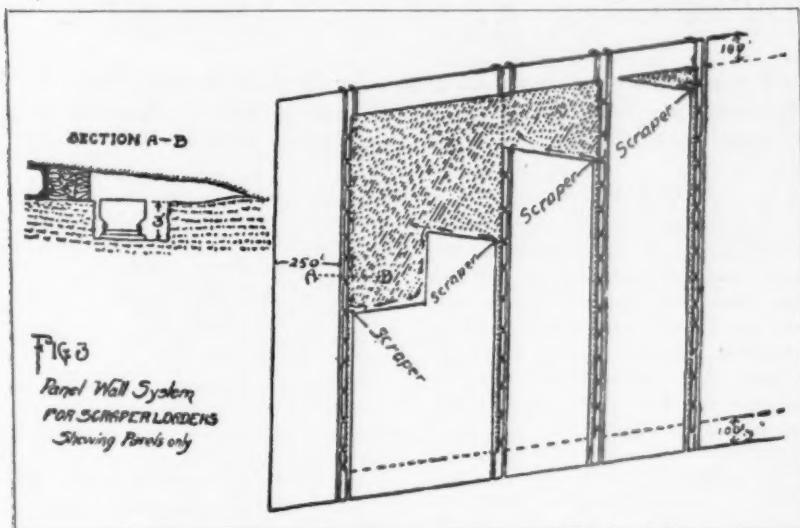
amount of very fine dust which was always in suspension at the face, and therefore met objections from the Mine Inspector. Depreciation, power and upkeep charges were prohibitive. This machine would drive a tremendous amount of entry and its use might be justified where phenomenal progress was the first consideration. It would also need a very lenient inspector, at least under the Pennsylvania State law. Some experiments were carried on with the "V" system, which ended in failure. The evidence in this case showed that no matter which virtues are claimed for the "V" system in West Virginia, it is not applicable in Pennsylvania except in a few isolated places. During the last four years I had the opportunity to inspect probably twelve operations of other companies who were experimenting along these lines, but saw nothing that differed in any way from our own experience.

There are several matters which effect all systems of mechanical loading alike and I will endeavor to cover them briefly in their order of importance.

(1) *Systems of mining in relation to mechanical loading.* One of the first things the loader expert wishes to do is change your system of mining to suit his machine and in the majority of cases he get you into serious trouble. A good thing to remember at this point is that our standard American plan of mining, usually called room and pillar is not the idea of some one mining man but has been reached in a very different manner. Everyone started to mine coal according to their various degrees of knowledge or



ignorance as the case might be, and all have eventually come to the same thing, namely some form of room and pillar with the same basic principal throughout. This system has proven its worth in the most impressive way for it has the virtue of being the only one that has worked consistently. Therefore, when we jump at one of these new systems we must claim that we have found something which the entire mining fraternity has overlooked, or else admit that it is at best an experiment. This experiment is very liable to prove costly if tried in a mine where the capital invested amounts to millions. In one particular instance we had very rosy pictures of a new system that was getting the coal for almost nothing in West Virginia. Our company sent a man to report on it and he found the following actual conditions: Their mining costs were astonishingly low, but they were driving single entries in a gaseous seam. They were also winning their coal over a single road or opening. Neither of these things may be done under the Pennsylvania law. When the weight followed them too fast they just moved down the line and left in some cases 60 foot blocks to be caved in. In several ways they were operating with absolute disregard of sound mining principles and will some day have to pay the bill either by disaster or by a wrecked property. The loading machine man makes his living selling loading machines, the coal man makes his living selling coal. Keep these two things in mind when the expert is broadcasting the virtues of his machine or some weird system of mining, and get together.



The foregoing is not to be taken to mean that nothing new can be worked out, far from it, but what I do want to bring out forcibly is that great caution must be exercised. There have been entirely too many so-called systems brought out lately which have no virtue other than freakishness.

The subject of systems of mining brings up the matter of working loading machines to obtain maximum output. All experience points toward long faces in order to simplify operations and the hitch in the proposition so far has been, how to obtain these long faces without violating sound mining principles.

In general two systems appear at once; first, a plan of face advance coupled with gradual settlement on packs or waste which is almost a duplicate of European Longwall and is only applicable to comparatively low seams, say under five feet in thickness.

Experiments in the Rocky Mountain field have proven that this system is not applicable to our thick pitching seams, and it must be discarded for enough experimental work has been done to prove it is not feasible.

The other system is the caving or open goaf system, which has been used with success in the thicker seams in Europe and some experiments in this country show that it holds considerable hope if certain basic principles are not violated.

Here one must admit that the mining fraternity is sadly behind the times for we know little or nothing about the action of roof strata in caving and are inclined to go largely by signs and tokens as our grandfathers did in planting their crops.

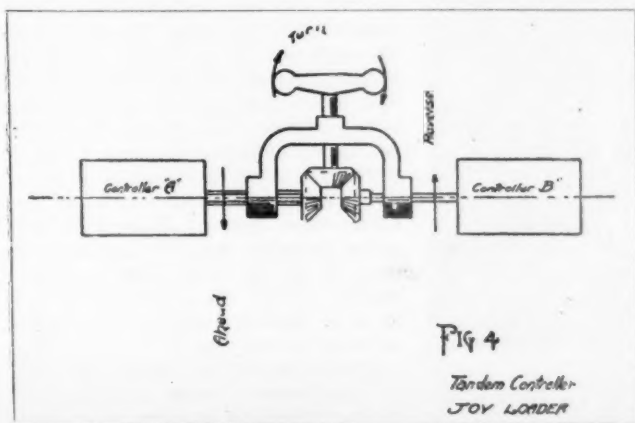
(2) *Labor and Mechanical Loading.* Labor has always resented any new machinery or methods regardless of the fact that such things have always worked to the direct benefit of the laboring man. Mechanical loading will eventually benefit the miner more than the operator for it will destroy the last stronghold of old man "hard work." Who, after seeing a modern chain machine cut across the face at a speed of as much as 36 inches per minute, would want to lay down on a shovel and put in an undercut with a pick? Some day we will look at loading coal by hand in the same way.

True, the number of miners may be reduced, although this was not the case with mechanical undercutting machines, but the loading machine operator will be better paid and will have a pleasanter and safer job. In

starting mechanical loading at any plant great care should be used in selecting crews for the first machines, as much depends on getting a good start. A demonstrator and one man is enough for the first day or so while limbering up the new machine. Avoid large gangs of men around the machine at all times, adding numbers to the crew only as their need is proven. If too many men are put on at first they are in each other's way and when the force is reduced it always leads to misunderstandings. The best type of mechanical loader operator seems to be a young man of mechanical trend who has considerable native intelligence, plus not too much actual mining experience. This type seems less troubled by the old prejudices and inhibitions which trouble those of us who have put in a lifetime underground. Another thing, do not allow visitors. I would like to make this rigid enough to exclude everyone, but I suppose this would be unfair as representatives from other companies should be extended some courtesy. I would suggest, however, that you establish a hard and fast ruling that only one person be allowed to make an inspection trip at a time. My reason for this, I believe, is sound for the continual running in and out of strangers disorganizes your force and keeps them always in a state of nervous tension, and it irritates the mine officials by causing them an unnecessary amount of extra bother. At one time I had to take twelve society buds in to see the Joy machine in operation while the mine was working. The machine very appropriately tore itself to pieces the first five minutes they were in the place.

(3) *Accidents directly chargeable to mechanical loading.* In this respect the mechanical loaders made an exceptional record. We had no serious accidents during our whole experience and suffered but four minor accidents. Two of these were slight hand injuries incurred by the car trimmers and were caused by blows struck on the hand by lumps; one machine operator ran the Joy tractor on his foot, smashing a toe. The electrician received severe burns on his hand from one of the open switches on the Joy machine. Our experience along these lines seemed to show that mechanical loading increased rather than decreased safety.

(4) *Hazard from ignition of gas and dust.* This is a very serious matter and deserves much more study than mechanical loading men are giving to it at present. In my humble opinion the types of machine that load directly at the working face are an actual hazard in this respect. Few, if any, of these machines are equipped with approved electric apparatus for (Continued on page 633)



LONG FACE CONVEYOR METHODS AT SWEETWATER MINE*

A Description Of The Conduct Of Operation By Long Face Conveyor Method At The Sweetwater Mine Of The Gunn-Quealy Coal Company, Rock Springs, Wyoming, Where Approximately 65,000 Tons Of Coal Were Produced In Less Than Twelve Months

By GLEN A. KNOX†

THE coal in the Sweetwater mine has an average of six feet three inches in thickness, and lies on an average pitch of five degrees. The roof is a sandy shale of medium hardness and has been generally considered as good top in the room and pillar method of mining.

When our company became interested in conveyors, the writer visited most of the mines in the East where conveyors and other mechanical methods of mining were in use and decided that a modified method of what is in use at the Norton-West Virginia mine would be the most feasible for our conditions. We installed three hundred feet of conveyor as an experiment to see whether or not our roof could be handled and taken care of on long faces. This three hundred feet was installed as two separate conveyors, one as a face conveyor—100 feet in length, the other as a heading conveyor that delivered the coal into the mine car on the main entry. This face was worked directly on the strike and down the pitch. This did not prove to be a success as the caving of the roof carried over to the working face and necessitated propping between the conveyor and the face and it was also necessary to shovel coal on the conveyor up the pitch. After working out this block, 200 feet in length, we installed these two conveyors at a place adjoining this worked out block, but in a half V shape. This block of coal was sixty feet wide. This method proved to be very successful. We cut a place, moved the conveyor against the face before shooting and carried two rows of cribs between the conveyor and the cave, and caved the roof every second cut. After working out this block we were satisfied that this system was feasible with our mine. We then ordered twelve hundred feet more of the same type as the trial conveyor with the exception of a few

modifications. We then installed this fifteen hundred foot unit on our four faces with one hundred feet to each face, two hundred feet on each heading and three hundred feet on the main conveyor that delivered the coal into the pit cars. We also had a head and rear section for each of four advancing places. As the sections were taken out of the heading conveyors they were installed on the advancing conveyors, and when the faces approached the main conveyor, the main conveyor was taken

out and installed in the next uphill or main conveyor place. The roof caved very well in line of the points and was broken about every twenty feet. It broke in a straight line and did not curve at each V. We encountered no trouble unless we permitted one of the points to get behind.

The maximum tonnage possible to be produced on this method was estimated to be seven hundred and twenty-five tons a day, assuming that all places were cut and cleaned up in one shift, and this we did for several consecutive days.

While this was a success from a cost standpoint, we felt that we could get a greater tonnage from the same amount of conveyor if we changed over to a long wall method, using one face of two hundred fifty feet in length with a total of five hundred feet of conveyor in use. In starting off on this method, we tried to keep the cave from twenty to twenty-five feet from the face. This did not prove to be a success and after we had gone only about fifty feet, the roof rode over to the cribs to the face, forcing us to abandon it. We then installed

two face conveyors of two hundred fifty feet each in length, one face working out to the place abandoned and the other going in the opposite direction. We adopted the plan of caving the roof every second cut and have been working on that plan ever since with very good success with the roof. We set a row of breakers with props eight inches or larger in diameter about eighteen inches apart in a perfectly straight line the entire length of the face. We placed cribs made of reject railroad ties about fifteen feet apart the entire length of the face. This gives us a crib two feet eight inches square. These cribs are set on about six inches of bug dust. It is very seldom that they take any weight, as they are used only in case of some unusual condition that causes the roof to ride over the props to the face and are only to protect the men and machinery in cases of this kind. We have produced an average of three-



Link-Belt Long Face Conveyor Equipment as Installed at the Sweetwater Mine, Gunn-Quealy Co.

* Paper presented to Meeting, Rocky Mountain Coal Mining Institute.

† General Superintendent, Gunn-Quealy Coal Company.

hundred fifty-nine tons every working day and the mine has worked every day except Sunday.

One long face with necessary development work has taken care of our business by working the mine every day. It is my opinion that this method of mining should be kept going every day if possible, as, if it is permitted to stand still for a few days, the roof will gradually settle and break along the face. It is also true of the half V method. We did not get along so well by working it only two or three days a week. The long wall system is a more flexible proposition, as you can work continuously either one or more faces as the market for coal demands.

We first began producing coal from the trial conveyor on September 6, 1924. The recovery has been one hundred percent, as we have recovered on an average of between sixteen and seventeen hundred tons per foot per acre. The expense of maintaining these conveyors has been practically nothing so far. During this period we have not had a man even slightly injured by falls or with the machinery.

All face, heading and advancing conveyors are run at a speed of thirty feet per minute and driven with a General Electric 15 H.P., High Starting Torque Type Motor, speed of which is 900 R.P.M. The speed is reduced by a right angle speed reducer. The main conveyor when used on the half V method was driven at a speed of ninety feet per minute and with a 50 H.P. motor of the same type. The conveyors are made up of six-foot sections and all sections in all conveyors, that is the heading, face and main conveyor, are of the same type and are interchangeable.

In shooting this long face, we began at the upper end. The holes are placed ten feet apart and we then start the conveyor and fire the shots one minute apart, keeping the conveyor running continuously. We find this custom to be very satisfactory. When working it on the half V system, we shot the coal down on to the conveyor the full length of the one hundred foot face while the conveyor was standing still. We had no trouble in starting the conveyor up under this load. As a rough estimate I would say that approximately ten percent of the cut is loaded out without being handled with shovels. As above stated, the conveyor is placed directly against the face before shooting.

The conveyor is constructed along rather heavy lines and will withstand a reasonable fall. We have never damaged a section by shooting the coal onto it. We are working this system under five hundred feet of cover. It has shown no displacement or sign of settling on the surface.

I do not believe that the difference in percentage of the different grades of coal has been very materially changed, as the advantage in shooting or working the long faces is overcome by the breakage in handling it with the conveyors.

MECHANICAL LOADING IN CENTRAL PENNSYLVANIA

(Continued from page 631)

two reasons, one, the extra cost and the other the fact that approved electric equipment is protected by iron-clad patent rights which are in the possession of the old established machinery companies. These companies are very reluctant to grant the use of these devices to any persons who may some day develop into strong competitors. These machines, while they do not make enough fine coal to affect the market value, do make a large quantity of very fine flour-like dust. This dust is made in the worst possible place, namely, at the face. The Pennsylvania department of mines granted a dispensation to mechanical loading machines, allowing them to use open type motors, etc., in gaseous mines, this dispensation expiring sometime in 1925 as I remember. Little progress has been made as far as I know to remedy this condition and I am much afraid that sooner or later the origin of an explosion will be traced to one or the other of these machines, and this will be a very severe blow to mechanical loading. Due to the concentration of work, the faces advance much more rapidly than by hand loading and this increases the gas emission in seams where the gas is occluded in the coal itself. This condition coupled with the large amount of fine dust which is always in suspension around the machine itself makes an ideal point of ignition in case of a severe controller fire. We found it impossible to run enough water over a place to keep this dust down, at times we had the places so wet that the men complained but the machines were still surrounded by a haze of dust. This in our moist eastern climate, which leads me to think that conditions might be worse out here.

(5) *Haulage and mechanical loading.* It has been contended by almost everyone that mechanical loading is largely a haulage problem and that much delay can be traced to this cause. Regardless of what the experience of others has been we did not find this the case. If one does not give the problem very deep consideration one is liable to be misled and arrive at erroneous conclusions. The situation is really this: At the present time the loaders are so erratic in their performance that it is not practical to provide a haulage that will take care of their maximum hourly pro-

duction as the costs would be prohibitive. For instance, our best hour's record with the Joy was 70 tons, this would amount to 560 tons per 8-hour shift. Now at our haulage cost, which was 9 cents per ton, we could have spent 9 times 560, or \$50.40 on the haulage from this machine and not increased our haulage costs, but the machine actually averaged 71 tons per shift which, had we spent the \$50.40 required to care for peak production, would have made our haulage costs alone for the Joy 71 cents per ton, which would have been ridiculous. Mechanical loaders are being improved very rapidly and their performance is tending to become more uniform, therefore this difficulty is much less than with the more primitive type of loader.

The most sensible plan at present is to devise a haulage system that will take care of slightly more than the average production and strengthen it as the loader becomes more dependable. I believe that whenever the loader can load at a regular pace that we can haul the coal more easily than from hand loaders for the amount of territory to cover is much smaller. As to pit car sizes there is no question that the large size car makes for economy, but at present we are not in position to say just what size car we want, therefore, if we go too fast in this direction we may find that when mechanical loading is perfected we still do not have the car we need. In old mines with long haulage roads I question very much if it is good business to attempt any radical change in gauge or car size, as the initial expenditure is entirely too great. However, in a new operation it is good policy to endeavor to get the maximum capacity car that conditions will permit as this is economical whether the coal is loaded by hand or machine.

To sum up the results of my observations, mechanical loading is still in the experimental stage. No outstanding machine has as yet been developed. They make the loading of clean coal very difficult. They constitute another "Ignition Hazard" of which we have too many at present. Labor is only partially reconciled to their introduction. Notwithstanding all this they have made so much progress in the last five years that I expect to see all these difficulties eliminated and a large percentage of our coal loaded by machines in the next few years.

The United States Bureau of Fisheries reports that through its development of copper oleate as a net preservative, the life of netting has been doubled. To offset the higher cost of copper oleate as compared with other preservatives, the Bureau is experimenting with other copper compounds and combinations with other preservatives to lower their costs.

THE NATION'S VIEWPOINT



A Digest Of The Expressed Opinions Of Leaders In American Affairs

WITH the present antipathy of the public to Federal interference in private business affairs, the recent utterances of the Honorable Herbert C. Hoover, Secretary of Commerce, have been of significance. In a recent address on "Why the public interest requires state rather than federal regulation of electric public utilities," Mr. Hoover says:

"Before we abandon the system worked out by the 48 states let us be sure that we have something better to take its place. This raises at once a grave question as to whether the basis of our dual government which has brought us such untold blessings in the past can survive if the shifting of economic life is to impose constantly greater centralization on a Federal authority ill-designed to carry such burdens. Within the lifetime of men here we shall have 150,000,000 people. The infinite energies of this great mass of humanity will be dulled and their progress stopped if we are to attempt their government from Washington. I believe there is no surer method of sapping the freedom of self-government and the sense of responsibility of our citizens than unnecessary extension of Federal control over economic services which so vitally touch the life of every family, every industry, and every community.

"It, therefore, becomes our duty to examine every proposed step in this direction, and where a resolute necessity does not impel we must oppose it, if only for the purpose of the preservation of self-government.

"Where the states can equally well solve these problems there is no remote reason for Federal invasion.

"Washington is already so overloaded with affairs that it can not even now do justice to the great diversity of local interest. As has been mentioned, a population of 150,000,000 in our borders is probable within the lifetime of men here. Of

these, for instance, 20,000,000 will be upon the Pacific slope. Can Washington regulate their electric power service as well as they can do it themselves? And it is the same with every other part of the country.

"It is a part of the fulness of life that we should live and participate in the government of our local communities — local government that neither wishes its responsibilities onto a centralized bureaucracy nor allows centralized bureaucracy to dictate to that local government. Nor do I believe the people of our communities have yet become so supine or so careless of the fundamental advantages of self-government that they are ready to surrender control of their most intimate concerns to a paternal government at Washington, however wise or however powerful."

United States Senator Edge, of New Jersey, in a recent statement on the reorganization of executive departments in Washington, says:

"I recognize a clear distinction between legislative and Executive responsibility. It is for Congress to

create or to abolish. It is for the Executive through his cabinet officers and general organization to administer. I would give the President broad powers of transferral and consolidation to enable him to secure the greatest efficiency and economy from this great governmental organization. I would not give him the power to abolish existing activities, or as stated, to create new ones, but I would, however, permit the one man responsible to the country for results to use that great machinery to the best possible business advantage. Consolidations or transferrals, without terminating the service, would demonstrate where many existing departments could be abolished. It would then be the duty of the Executive to so recommend to Congress and in many cases at least curtailment would undoubtedly be approved. In the meantime, it is reasonable to expect increased efficiency.

"The hard and fast reorganization plan, with Congress specifying, through legislation, where this department shall be placed and where this consolidation shall be made, invites powerful opposition from those affected. This has been manifest in the past and contributed greatly to the failure of the legislation. This would not apply in such force if the President had the power of initiation. Even if such a clearly defined bill could be passed, it would be experimental to say the least. I can readily picture continued requests to Congress, possibly to change back to the original plan. Any organization so general in scope as the government, in order to be responsive, must be flexible and not dependent upon the uncertain methods of legislative action.

"In other words, if any of the departments rearranged by Congress failed to function as anticipated, the same slow and uncertain process must be depended upon to unscramble them. In these days business demands and is entitled to action and rearranging departments should not be entirely sub-



A Good Job as Far as It Goes



ject to Congressional approval or disapproval. Let the one man responsible to the people, the Chief Executive, have a business-like opportunity to at least secure something like a maximum of results from the organization over which he presides.

“I am under the impression that the country would be just as well, if not a little better, satisfied to have the President with his advisers given a little more latitude, than to have action on the part of an unwieldy Congress necessary, even in minor matters of departmental reorganization.”

Samuel O. Dunn, editor of *Railway Age*, in a recent public address, said that “The American people still have a serious railroad problem on their hands, after twenty years of strict governmental regulation, because they have persistently refused to carry out any consistent policy of regulation.” Amplifying his statement, Mr. Dunn said:

“The complete reversal within the last five years in the government’s attitude toward consolidations, and the failure of the Interstate Commerce Commission to so fix rates as to let the railways earn the fair return required by the Transportation Act, are striking examples of the way in which the government has constantly changed the rules of the railroad game and has failed to carry

out the rules laid down by itself, with the result of keeping the railroad problem unsolved and a menace to the country’s welfare.

“For 30 years Congress maintained and government officers enforced under the Sherman Anti-trust law a policy of preventing and breaking up virtually all railroad consolidations. Then suddenly the government completely reversed its attitude and directed the Interstate Commerce Commission to make a plan for wholesale consolidations, and now there is widespread advocacy of compulsory legislation to force all the railroads to consolidate into a few huge systems.

“This program is based on certain assumptions which thus far have had no real evidence advanced in support of them, and yet those who do not readily accept it are being criticized on the ground that they are helping to prevent the solution of the railroad problem.

“The advocacy of compulsory consolidation legislation is necessarily based upon the assumption that the government officers who would apply the compulsion would be better judges than railway men of what consolidations should be made. In view of the fact that government officers for years tried to prevent all consolidations, how can it reasonably be as-

sumed that government officers would now know better than railway officers just how the railways should be consolidated in order to secure the best management?

“Another assumption upon which this scheme for compulsory consolidations is based is that a few huge systems could and would be much more economically operated than even our present larger systems, and that in consequence great savings would be effected which would not only make unnecessary advances in rates on the western roads, for example, but would make possible large reductions of rates. This argument for consolidations is now constantly appearing in the discussions of the railroad question by certain public men. But where is the evidence that the consolidations of the railways into a few systems would have this result? None is advanced and as a matter of fact none can be advanced. Railway progress in this country has been largely due to consolidations, and there are many which may yet be made with benefit to the railways and the public, but the advocates of compulsory consolidation legislation are greatly exaggerating the economies which can be secured, thereby trying to create a public sentiment in favor of compulsory consolidations, the actual results of which would be

greatly disappointing to the public.

"The strongest argument for consolidations is that by the combination of weak and strong roads the problem of rate regulation would be simplified, but even this argument can be pushed too far because the strength and weakness of different roads are constantly changing, and only by the most exhaustive study of present conditions and probable future developments can it be determined whether if two or more roads are amalgamated today they will probably constitute a strong and well balanced system ten years from now.

"The only safe policy for the nation is for the Transportation Act to be so modified as to authorize the railways voluntarily to work out proposed consolidations which the Interstate Commerce Commission should be empowered to approve or reject upon such conditions as it may regard as in the public interest.

"The railroad problem will not be permanently solved under private management without a consistent policy of regulation based upon sound economic principles. Compulsory consolidations would be wholly inconsistent with the past policy of the nation in dealing with railroad and other business affairs. Furthermore, the continued failure of the Interstate Commerce Commission to so adjust rates as to enable the railways to earn a fair return would be wholly inconsistent with the provisions of the Transportation Act under which the railways were returned to private operation five years ago, and would be a repudiation of that law by the government tribunal charged with its administration.

"The public cannot both eat its cake and keep it. It cannot retain private ownership with the benefits derived from it, and at the same time follow an inconsistent and unprincipled policy of regulation under which no private industry could be successfully conducted."

Recently Secretary of the Treasury Mellon strenuously objected to the exemption of incomes under \$5,000 on the ground that to "relieve so many persons from taxation would take away much of their interest in the economical management of their government, which would be an unfortunate situation from the point of view of the public good." *The Manufacturers Record*, while approving Mr. Mellon's position, goes much further in indorsing general taxation.

"With this position we are in hearty accord, and we go much further than Secretary Mellon and strongly suggest that the reasons

why incomes under \$5,000 should not be exempted from taxation applies to all incomes, however much below \$5,000 they may be. If every man and woman in the country had to make a report of income and pay a small amount of taxes, there would be developed a nation-wide interest in the economical management of the government to the great advantage of the whole country.

"So long as only 7,000,000 people out of our total population make any income returns, and so long as a considerable proportion of these do not pay any income taxation, a limited number of people are required to bear this burden for the benefit of others, all of whom should share in proportion to the amount of their income in the support of the government.

"As a man's income increases the rate of taxation increases, which is class legislation, and which should never be permitted in this country under any circumstances. If John Smith owns one acre of land and his neighbor owns 500 acres, the rate of taxation is exactly the same on the small tract as on the big tract, the only difference being measured in the intrinsic value of the properties for taxation. The same rule should prevail as to income taxation. The man of small income should pay in exactly the same proportion as the man of large income. In that way all the people of the country would take a deeper interest in the economical management of the government, all of them would feel that they are contributing to its maintenance, and the idea of class interests separating the rich man from the poor man would be done away with.

"Every unnecessary dollar that is taken away from large incomes is a loss to the government, because it is a loss to the country as a whole, lessening the amount of available capital for carrying on its development work.

"It has been said that \$10,000,000,000 must be expended within the next decade upon the extension of electrical operations. We think this estimate is too low. There will be needed a very much larger amount if it can be had at a rate that is profitable for such work. The railroads need enormous expansion, for already their traffic is increasing more rapidly than their facilities.

"The larger sums that would be saved to men of means by the heavy reduction of their surtaxes would immediately go into constructive enterprises, creating new work for all classes of people and adding to the

prosperity of the man of small means.

"That is one viewpoint from which to consider the important question. But a broader view is the one which should make no differentiation between classes, but which should require a report on every income, however small, from every man and woman. A spirit of patriotism or of knowledge of the country's affairs would thus be created. It is true that the handling of these small incomes would be somewhat expensive in proportion to the amount involved, but that is of trifling importance compared with the desirability of having every man and woman in the country acquainted with the whole income-tax situation.

"When Secretary Mellon, therefore, opposes the elimination of taxation from all incomes under \$5,000 he should carry out his plan and include incomes from every man and woman, however small may be the amount."

Some of the leading newspapers editorially have indorsed a general idea that business should be taxed when it is in a prosperous state and relieved from all taxation during periods of dullness. The fallacy of any such proposition is emphatically commented upon by the editors of the *Wall Street Journal*, who say:

"Editorial writers of this kind are seldom well informed and never competently edited. Neither of these critics knows where the tax burden is, and who imposes it. Obviously, neither of them appreciate the record of Congress where every dollar collected would be squandered unproductively as, for instance, on the Shipping Board, futile irrigation projects, the pumping of water into unnavigable rivers, the building of \$50,000 postoffices in thirty-cent towns, the endowment of endless meddlesome bureaus, and the creation of redundant jobs. The country would not be prosperous for any considerable length of time if it were taxed to the limit when business was good.

"But the bulk of the tax burden is no longer imposed by the Federal government. There was an actual increase in total taxation in the year 1924, although the federal taxes had been reduced by \$125,000,000, because state taxes increased in that year \$119,000,000, and those levied by local governments \$147,000,000. It is the local burden which is not merely heavy but vexatious. It is, of course, exasperating to a southern democratic paper or a northern independent to find a republican government charging the country less for its services.



Looks Like It's Going to Be a Long Session



A Mighty Poor Time for a Fumble

Critics of the Coolidge administration and that which preceded it have prophesied the end of tax reduction for the past four years.

"But they see that reduction of the national debt will reduce taxes automatically for years to come and they don't like the idea. Our greatest trouble is that so many of our politicians, like those which ran the country during the Wilson administration, have had no experience in saving money. Like the improvident and thriftless anywhere it burns a hole in their pocket until it is spent. Local and state politicians are drawn from an even lower level, and their whole history is one of unintelligent waste.

"The idea that taxes can be collected now and saved for future contingencies, as the Springfield Republican suggests, will not hold water. Every cent of such collection would be irrecoverably spent, and not used in that productive expenditure of general business which is the real insurance against such coming depressions as the critics of Secretary Mellon fear."

This same Journal also is of the opinion that neither Congress nor the Treasury Department has been able to define "earned income." They take both of these agencies to task quite severely in the following language:

"The congressional definition is characteristic. It is that nothing can possibly be 'earned' above the congressional salary of \$10,000. The treasury view is not so asinine as that, but it implies, in effect, that the only earned incomes are salaries and wages.

"Analyzed, the latter proposition means that the man who writes for a newspaper at a salary earns his income, while the man who is paid for the books he writes by royalties does not earn his income. It would even be possible to reduce this proposition to the limit of absurdity by giving all the employees in a going concern a stock interest instead of salaries or wages. Their stock dividends, on the treasury ruling, would cease to be earned income.

"And why establish a limit, either of \$10,000 or \$100,000, for incomes earned? It is not merely true that the higher the salary or wages earned the more valuable the services are. It may be said that the salaries increase in arithmetical proportion while the value of the services increase in geometrical proportion. The man who is receiving \$25,000 a year, as a responsible and creative officer of a great business, is worth far more than ten times the \$2,500 man who performs merely routine work.

"Indeed, the value of the service is so patent that instead of his tax in-

creasing as his salary rises, it might well be diminished to the vanishing point, as a reward for what he does for the prosperity of the country and his fellow citizens in his kind of creative work, without which the man of small income would be hard put to it to find employment.

"There is no such clear dividing line between earned and unearned income as even intelligent Treasury officials assume. There are innumerable instances where stock dividends and even interest on bonds are the direct reward of work actually performed. To take only one instance out of scores, the man who has a stock interest in addition to salary earns every penny of the dividend. On the Treasury showing the real estate agent who manages other people's rented houses, earns his income, but the man who is his own agent for collecting rents and seeing after repairs earns nothing.

"All legislation by popular assemblies, and certainly all tax legislation, must be, to some extent, a compromise. But now that Congress is reshaping the income and other direct taxes, it should be possible to secure a compromise which does not insult public intelligence."

The statement of a foreign diplomat that public opinion is the real ruler of the United States has caused consider-

able comment by the press. The *New York Times* wants to know, "Where is the evidence for such a statement?" and asks "who can tell what the people really think?" They further point out with special reference to public opinion and tax reduction that:

"We are having before our eyes at Washington just now a vivid illustration of the fact that there still is in this country a public opinion that can be concentrated and so stirred into a demand for action that the authorities answer as quickly and docilely as did the jinn when Aladdin's lamp was rubbed.

"The reference is, of course, to the accelerated movement for the further reduction of Federal taxes—in particular the heavy surtaxes on incomes. When a plan of that kind was first put out by Secretary Mellon in the fall of 1923, it was fallen upon tooth and nail by political opponents. A presidential election was impending, so that it was easy for partisans to raise objections, attribute wrong motives, make charges of partiality to great wealth, and so on along the whole gamut of demagoguery. When the project finally got into Congress it was buffeted about and battered almost out of recognition. The outcome for the time being was most disappointing. Neither the Secretary of the Treasury nor the President could get in the way of legislation even approximately what he wanted. But they both bided their time. Indeed, the shrewd remark was attributed to Secretary Mellon that perhaps it would be just as well to have the whole program of tax reduction "in abeyance" until after the presidential election.

"He at least saw how public opinion might be shaped and moved. A process of education had to be gone through. In this the people were apter scholars than were the politicians. Long before the latter discerned the signs of the times, the general public became aware of the drift of events and was ready to quicken it. The result was what we are now witnessing in Washington. Tax reduction has become the most popular thing going. Senators and representatives are crowding against each other in a competition to see who first can do most to relieve the burden of taxation. Even the vehement congressmen who last year were vowing that they would never consent to a surtax lower than 40 percent are now meekly ready to accept one of 20 percent. It would



Wallace Press-Times
After All, the Chopper Has the Right to Choose His Own Axe

seem that Secretary Mellon is entitled to smile grimly at the spectacle and to say that all can raise tax reduction now for all have got the seed.

"The ends to be attained in this legislation are important, admittedly. The benefits will extend to individuals by the million and collectively to the whole nation. But just at present the thing which our pessimistic writers on American Government ought to fix their eyes upon is the method by which this great alteration in the tax outlook has been brought about. It is clearly the consequence of a slowly aroused public opinion which presently becomes invincible. In this concrete case we can perceive how it works. First information must be given. The facts must be established. Then the fitting of means to ends needs to be made clear. The good aimed at for the generality must be shown to be not only attainable but conceived in fairness and equality. Then the voters can safely be left to do the rest.

"They flocked to the support of President Coolidge largely on account of their approval of his policies of retrenchment and the cutting down of taxes. As Judge Gary has just pointed out, the President will now be able to make his appeals to Congress stronger and more compelling than a year ago. The reason is plain. A slowly gathered but steadily mounting public opinion is behind his main policies. Here, at any rate, is one instance of the continuous possibility in this country of taking a large question to the people and getting from them, perhaps after initial failures and provoking delays, a response so

unmistakable and powerful that by a kind of moral gravitation it draws to itself even unwilling statesmen."

The November issue of the *Oil Trade* pertinently inquires, "Are some taxes unjust?" and then undertakes to show that they are, particularly on gasoline.

"A survey by *Oil Trade* shows that 44 of our states and the District of Columbia now levy gasoline taxes. In three of these the rate is 1 cent, in 21 it is 2 cents, in one it is 2½ cents, in 12 it is 3 cents, in three it is 3½ cents, in four it is 4 cents, and in one it is 5 cents.

"Taking a mathematical average of all states, including those having no tax, the average rate per gallon for the entire United States is 2.4 cents. If domestic consumption of gasoline increases during 1925

at the same rate it increased during 1924—16 percent—the total consumption will be approximately 215,000,000 barrels, or 9,030,000,000 gallons. Based on this rate of increase a total of \$216,720,000 will be paid in gasoline taxes during the year by American motorists.

"An interesting side-light here is the fact that all of the states in which there is no tax—Illinois, New York, New Jersey and Massachusetts—contain large city populations, where the citizens are seemingly not so dependent on roads as in the agricultural states.

"Few will deny that taxation of gasoline for the upkeep and building of roads is fair. Naturally, the motorists are the ones who derive the most benefit from the roads. Moreover, the tax coincides with the recent tendencies to get away from the old American desire to tax tangible assets only, and to levy on production, incomes, and expenditures. The production tax is not feasible because it arrests production. The income tax is feasible, but is hampered by provisions and exceptions that easily allow it to become unreasonable.

"Taxation of expenditures is one solution, though it may be misused. It encourages thrift, which we want all Americans to practice, and puts the burden on the user, but it often discriminates between products, making the rate on one exceedingly high, while others go unburdened. In South Carolina, for instance, where the tank wagon price is 20 cents at present, the tax is 5 cents. A 25 percent sales tax is a load that no industry can stagger under for long. Add to, this

an inspection and a city tax and an astounding figure results. It is unfair.

"Since we must have gasoline taxes, let oil men work toward some universal method of levying at a fair, fixed rate, rather than leave the industry at the mercy of the general fiscal needs of each state."

Iron Age is of the opinion that evidence is rapidly accumulating to show the ability of our manufacturers to maintain their position in foreign markets despite the high level of American wages and of raw material prices. They point out that:

"Evidence is accumulating of the ability of our manufacturers to maintain their position in foreign markets, despite the high level of American wages and of raw material prices. In the fiscal year ended June 30 exports of American products were 29 percent greater than for the same period three years earlier, when the country was operating under the lower duties of the Underwood tariff law. Imports meantime had increased 46.6 percent, but the excess of exports over imports had remained well over \$1,000,000,000, as in the earlier year.

"Comparing the nine months of 1925 with the corresponding period of 1924, our exports have gained \$883,000,000, while imports have gained \$409,000,000. The excess of total exports over total imports was \$424,000,000 this year and \$454,000,000 last year for the nine-months' period.

"Finished manufactures show a far greater excess of exports, the balance of trade this year having been \$792,000,000, against \$651,000,000 last year. In all the other classifications—crude materials, foodstuffs, semi-manufactured articles, etc.—imports have exceeded exports, except for larger outgoing shipments of manufactured foodstuffs. Finished manufactures form the greatest group in the entire export list, representing about 40 percent of the total in each of the two years, but only 20 percent of the smaller total of imports.

"Such exhibits run counter to the arguments that a protective tariff (1) discourages imports and (2) curtails exports by reason of the disinclination of other countries to buy where they cannot sell. Some of our heaviest sales have been made to Great Britain and Germany, our chief competitors for the world's trade in manufactured goods. Other forces are at work than those which so long have been cataloged in anti-tariff preachments."



Los Angeles Times

Beware the Monkey Wrench Brigade

The American Economist in a recent issue undertakes to prove that the prediction of the opponents of a protective tariff that, with added duties to pay, our imports would decrease, is purely a pessimistic prediction of the opposition. Taking the figures of the Department of Commerce, they point out:

"Opponents of protection throughout the United States volubly and vehemently predicted, just before the enactment of the existing protective tariff, in September, 1922, that, with added duties to pay, our imports would decrease, and that, as we used foreign raw materials to such an extent, the increased cost of them when used in manufacturing would inevitably reduce the foreign markets for our exports—that the passage of a protective tariff would cause a decrease in both our imports and our exports.

"Notably this was true in respect to the existing protective tariff. The facts knock these predictions into a cocked hat.

"During the fiscal year ended June 30, 1925, the total value of all imports, according to the Monthly Summary of Foreign Commerce of the United States, for June, issued by the Department of Commerce, was \$3,824,140,000; and during the fiscal year ending June 30, 1922—the last full year of the operation of the near free-trade Underwood tariff—the value of our imports was \$2,608,079,008, an increase under the protective tariff of no less than \$1,216,060,992, or 46.6 percent.

"The Government figures show dutiable imports during the year 1925 amounted in value to \$1,528,642,000,

and for the year 1922, to \$1,009,190,390, an increase under protection of \$519,451,610, or 51.3 percent. Free imports increased in the periods under consideration, but not so much as did the dutiable. The value of free imports during the year 1922 was \$1,598,888,618, and in 1925 their value was \$2,295,498,000, an increase in our imports of nondutiable goods with a value of \$696,609,382, or 43.5 percent. In respect to imports, total, dutiable, and free, the prediction was entirely wrong.

"Even as to our exports the opponents were equally awry in their predictions. The answer to these predictions is the facts. These show that, during the fiscal year ending June 30, 1922, the last full year of the Underwood near free-trade tariff, our exports totaled in value \$3,771,156,489, and during the fiscal year ending June 30, 1925, the last full year of the protective tariff, the value of our exports was \$4,864,832,000, an increase in the last-named year of \$1,093,675,551, or just 29 percent."

The United States Geological Survey has reported the total value of the mineral production of the United States in 1924 at approximately \$5,318,000,000. *The American Metal Market* presents an analysis of and comments upon the place these figures should make in the economies of the country, pointing out that:

"While 'mineral product' is a very comprehensive term, running from paint to petroleum and from lime to copper, still it represents a very definite conception, as to what we get out of the ground, just as agricultural products make a very definite conception.

"One might care to compare the 'mineral production' with the 'total production' of the United States, to see where this line of activity stands, but 'total production' does not really make any definite conception, because the basis of comparison we naturally would take represents the total work done, whereas some of the work is in producing things and some of the work is in rendering service, in hotels, in transportation, etc.

"A natural comparison would be with the total income of the people of the United States. This is an item with which some familiarity has been gained in recent years. Almost everyone who takes any interest in economic and business matters knows, roughly, that income was running at a little over 30 billion dollars before

the war and after the war got up to the sixty-billion class.

"The value of mineral production, however, can not be compared directly with total income, because in producing minerals money is paid out which becomes income to somebody else. It would be like the talk sometimes indulged in that nearly everything goes back to labor, because if you take a given product and follow it back far enough the machinery employed was made by labor, or if that machinery had been made by some other machinery, that machinery had been made by labor.

"In making its very careful and painstaking study some years ago of the national income, the National Bureau of Economic Research followed two lines of inquiry, one being to take the 'value product,' i. e., the value produced in each given line, and it may be of interest now to note the percentages its value product of the mineral industry constituted to the total values of the Geological Survey, which in the main represented its starting point. We have computed them as follows: 1913, 49 percent; 1914, 49 percent; 1915, 47 percent; 1916, 44 percent; 1917, 37 percent; 1918, 36 percent.

"Apparently there was a regular diminution from cost of supplies mounting more than did the receipts. At a rough guess the proportion might possibly be 40 percent in 1924, whereupon 40 percent of the reported mineral value for 1924 would be somewhat over two billion, or somewhat over 3 percent of the total income, which was probably between 60 and 70 billion in 1924."

Analogous to the wage dispute in the anthracite industry, the *Washington Post* recently pointed out that the American workingman has good reason to be satisfied with his lot. Comparing the wages that are paid to the workmen in other countries with America, they say:

"The American workingman has good reason to be satisfied with his lot. While Europe is torn by strikes and agitations among the laboring classes and the army of unemployed in England is growing constantly, here in the United States the workingman is 24 percent better off than he was at the beginning of the war, and 5 percent better off than at the peak of wage-earnings during the inflation



Washington Star

period of 1920. The national industrial conference board recently made an analysis of 'real' wages, that is, wages measured in terms of what the worker can buy with his earnings, with the result that it has been found that the workingman of this country is in far better condition than ever before. This is true especially of the men in the iron and steel industry, in the foundries and machine shops, and in the chemical, rubber, furniture, leather and automobile industries.

"Wages in the steel industry, for instance, have been increased about 140 percent above the prewar level, while the average price of its products is only about 34 percent higher than in 1914. In other words, while wages are nearly two and a half times what they were before the war, the prices of steel products have risen only about a third. In the automobile industry, wages have been increased approximately 122 percent, or more than double what they were before the war, while the average prices of automobiles are actually 29 percent lower than in 1914. Similar conditions are found in the other industries.

"This improvement in the condition of the American workingman is attributed in large measure to the higher degree of efficiency prevailing and the increased application of power in production, better utilization of labor, mechanical ingenuity and managerial efficiency. It is notable that the total volume of production from 1899 to 1923 increased 185 percent, and installed primary power 236 percent, whereas the number of wage earners in the same period increased only 90 percent, which conclusively shows the improvement in managerial efficiency, all of which helps the workingman as well as all other citizens."

An interesting comparison of the wages paid to anthracite miners and the salaries received by highly trained men of the United States Geological Survey and the Bureau of Mines is made in a recent editorial in the *Engineering and Mining Journal-Press*, in which they say:

"According to signed statements which the Anthracite Operators Conference is putting out, the 1924 average earnings of 18,957 contract miners was \$2,437.70, and to earn this the miners worked less than 6½ hours per day. Men paid by the day in 1924 averaged \$1,717. There were 921 men who worked 275 days and received \$3,947 each, or \$14.33 a day, this being the highest average of 15 averages published; these averages gradually sink to the lowest class, in which 1,439 men worked 261 days and received \$2,151 each, or \$8.25 a day. The operators state that the men who earned less worked only four or five days a week, 'due to failure to take advantage of their opportunities.'

"The miners are now on strike, asking an increase of \$1 a day for the day men and 10 percent increase for the contract miners. The operators inquire of the public at large, 'Are anthracite miners underpaid?' It's up to the public to decide and reply, for the public will pay the rate increase if it is granted. Each individual of the public—each reader of this article—will decide the question at once in his own way and according to his own lights. Many will consider somewhat enviously the pay of nearly 19,000 contract miners who averaged over \$2,400 in a year for an average day's work of 6½ hours. There will be many a white-collar man in the cities who will read this, and wish he could take off his collar, already perhaps a little grimy, and tackle the coal mines with their shorter hours and better pay. Let us quote again, for example, the extract from a Government circular advertisement, which we have already quoted in our issue of February 23, 1924:

"Vacancies at the Naval Experiment Station, Annapolis, Md., at \$4.56 per diem for laboratorian (mechanical), and \$4.32 per diem for laboratorian (metallurgical), and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from these examinations, unless it is found in the interest of the service to fill any

vacancy by reinstatement, transfer, or promotion.'

"Many a metal miner will entirely fail to sympathize with the wail of his dustier and less intelligent brother; but if reports are correct the coal miners have, indeed, on the average, enough intelligence to know that they are pretty well off, and if they strike it is because their general has ordered it. Concerning their own ideas as to when they have enough—has anybody enough? Do you not consider yourself underpaid, dear reader? Is not someone whom you know, inferior to yourself, earning bigger pay? Therefore, why be wroth with the coal miner? The philanthropic reader will and does wish him and all others all the pay and profits they can get. But somewhere a balance must be struck—an economic balance. The philanthropic reader will perhaps dig down, if the strike succeeds, and pay a dollar a ton more for his coal—for he must pay the increase, not the operator; but he will also be busy with schemes to avoid buying anthracite the next time, so that in the end the anthracite mines must compete in order to survive, and operators and miners alike must adjust their income so as to compete with the producers of other sources of heat and power."

"Guesses as to when the anthracite suspension will end are based on vague premises" is the view of the *Iron and Steel Report*. They, however, believe that there is important statistical information available which does furnish some basis for gauging the situation, and point out:

"A year ago production of anthracite was running at 1,750,000 tons a week, and this may be taken as a measure of requirements of those who normally use anthracite."

"A small offset to the loss of production is furnished by stocks of anthracite, as presumably some remain."

"The merchant ovens of the Connellsville coke region produced at the high point early this year 90,000 tons a week, while last July they were down to 45,000 tons. But the last Connellsville Courier report they have gotten up to 89,809 tons. In the neighborhood of 45,000 tons a week of coke is being contributed to replace anthracite. Coke is being



Washington Star

sought in other regions, not normally producing much, and at least a little coke will be secured in those quarters.

"Production of bituminous coal ran at about 7,500,000 tons a week April to July inclusive, and has now gotten up to 12,000,000 tons a week. How much of this is available as an anthracite substitute is another matter, but the largeness of 12,000,000 tons of bituminous a week against 1,750,000 tons of anthracite gives one an idea of the proportions."

"A very important fact is that the shipment of bituminous coal to the Lakes will end suddenly, at about the middle of November, or in a fortnight. The suddenness lies in the fact that these shipments increase during the season and stop quickly rather than taper off. Since September 1 the shipments to lake ports of bunker and cargo bituminous coal,



Wallace Press-Times

Must Have His Little Joke

have averaged 825,000 tons weekly, but the most recent pace is about 900,000 tons weekly. Much of this coal comes from mines having reasonably favorable freight rates to the East, and none is entirely out of the question. In the old days December always showed a weak coal market, particularly in the Pittsburgh district, which then furnished much of the lake coal. The weak market was considered unavoidable from the circumstance of lake shipments ending.

"The above points are merely statistical, indicating the alignment of affairs. Substitutes are being provided, and without any particular difficulty. Sharp advances have occurred in prices of some descriptions of bituminous coal, but even at the advances the fuel should cost the householder much less than anthracite."

"Guesses as to when the anthracite suspension will end have a tendency to center around January 1. Whatever arguments may be given, it looks as if guesses only are represented."

"As to who will lose in connection with the anthracite suspension, the case seems pretty clear that everyone will lose except the bituminous coal producers. Some of the substitution forced by the suspension will continue, as has been the case with previous suspensions, for statistics of annual production of anthracite show that the tonnage has not grown in keeping with the growing fuel requirements of the territory that long ago was committed to anthracite. A decrease in the annual tonnage means the anthracite operators must carry their investment a longer time to deplete the reserves. This makes an annual expense and the more that is put on the public the more the public will turn to other fuels."

"As to the United Mine Workers, they lose as to anthracite in that fewer men will be employed, although perhaps Mr. Lewis counts on an excess of men leaving the work over those entering the trade to balance this. In the bituminous branch the United Mine Workers lose, for the extra demand has gone chiefly to nonunion fields, while furthermore it is estimated that five-sixths of the bituminous coal soon to be released from the lake trade is nonunion."

Coal Mining Review believes that the coal industry's problems can be intelligently solved. They are firmly of the opinion, however, that they can not be solved by a dictatorial policy either on the part of the miners' union or on the part of the operator. Pointing out that coal is the most important basic industry of the country and that every other industry, even to transportation, depends upon the coal industry for their phenomenal development and existence, they say:

"The coal industry depends directly upon two groups of men for its development and the production of its most important basic commodity—coal. The two groups are the operators and the mine workers.

"There is a third group who are directly interested in the development of the coal industry, and that third group is the American people. How to consider and protect the rights of the operators, the miners and the American people, and eliminate strikes from the coal industry, is the important problem that must be solved, not by fighting, but in an intelligent manner.

"The solution of the many problems of the coal industry revolves around the question of where the operators' and miners' rights begin and end, and how the American people's rights are to be protected. It is a question which the operators and miners must eventually consider, not in an arbitrary manner, but in a conciliatory manner, and with a determination that both have rights which the other ought to respect.

"The problems of the coal industry cannot be solved by the dictatorial policy of the miners' union or the ultimatums of the executive officers of that union. Neither can the problems of the coal industry be solved by the operators, for reasons which are understood by the operators. The operators and miners are directly interested in the problems of the coal industry, and they are the men to solve the problems. When intelligence and reason are adopted as a method for the miners and operators to understand each other, it will not be difficult to solve the problems of the coal industry."

The determined refusal of the United Mine Workers to arbitrate their differences in the anthracite strike has led the *Black Diamond*, of Chicago, to compare the two words "arbitrary" and "arbitrate." In a recent editorial, they say:



Washington Post

Bumming Plane Designed by Old Gen. Swivelchair

"Arbitrary and arbitrate are two words which sound alike but which are opposite in meaning. One represents the extreme in everything—imperiousness, capriciousness, a domineering attitude which will brook no opposition. The other represents compromise—conciliation—agreement. These two words are personified by the difference between John L. Lewis, president of the United Mine Workers, and other labor leaders who realize that they cannot have all they might like to have.

"Whatever pretext John L. Lewis, as head of the United Mine Workers, may have advanced as his reason for being unwilling to arbitrate the differences between the anthracite operators and workers, the real reason is the arbitrary attitude of the leader of the United Mine Workers. Lewis realized, of course, that in arbitration proceedings he could not hope to secure all that he chose to demand. His demands were arbitrary, for he demanded all or nothing.

"There never can be and never will be peace in the coal mining industry when arbitrary methods are invoked, by the mine workers or any one else. There is always a common ground on which both sides to a controversy can meet and settle their differences amicably, but whenever any man or set of men become imbued with the belief that they can force others to bend to their will, especially in our industrial life, they must suffer the consequences.

"Whether it has been in dealing with the anthracite situation or with

situations arising in other states or in dealing with conditions which have arisen in connection with the economic situation which has developed since the war, Lewis has intentionally sought to drive home the fact that the operators were at the mercy of the United Mine Workers in fixing scales or even in operating their own mines.

"This arbitrary attitude has been responsible for keeping wages on a war-time level when the price of living was steadily dropping and wages were being adjusted in nearly every other line of industry to meet existing conditions, and the result under such conditions was to have been expected. Mines have been closed down—the union has steadily lost strength.

"It has been the arbitrary attitude of Lewis which has resulted in so many strikes in various sections of the country within the last few years—

strikes which have not only affected the business of coal operators but which have seriously impaired the earnings of the miners themselves.

"By his desire to arbitrarily secure all, whether it is just or fair or not, John L. Lewis is slowly but surely wrecking the once powerful organization of the United Mine Workers. Mr. Lewis will have good cause to realize eventually the difference between the two words, arbitrary and arbitrate."

This same publication insists that the outstanding characteristic of the anthracite operators in the present strike period is their willingness to publish and deal with facts, and the outstanding characteristic of the United Mine Workers has been that of making demagogic speeches, sending up trial balloons of rhetoric and, in general, keeping as far away from facts as possible. They further say:

"The claim of the United Mine Workers is that the anthracite workers are underpaid. Some of the statements of Mr. Lewis have been very inaccurate in this respect. Were it possible to show that miners do not receive sufficient income with which to live, the stand of the union would receive some measure of support. No disinterested body such as the general public, which knows Mr. Lewis quite well now, is gullible enough to accept Mr. Lewis' unsupported statement to that effect, unless definite data is presented.

"It is very fortunate that the incontrovertible facts of the case are in the hands of the operators. It is also

fortunate that, with a daily press leaning only toward the sensational in the anthracite controversy, the operators can convey such information to the public in the form of advertisements. At Atlantic City, when their turn came to present facts, Mr. Lewis walked out of the conference on silly pretense that Mr. Warriner and Mr. Richard must attend, or the conference would be useless. He ran away from facts.

"But the operators are now, so far as possible, publishing the exact facts gleaned from actual pay rolls. They show the cash received by anthracite miners in their pay envelopes, the net earnings for themselves from which there are no deductions. Some miners received \$500 per month, but the operators have not indulged in 'window dressing' in relating these facts. They show only the earnings that represent the whole industry.

"They show that the average 1924 earnings of 18,957 contract miners was \$2,437 and that they worked an average of less than seven hours daily. They show that day workers averaged \$1,717 in the same year. Men who earned less than that did so because they were not inclined to work every day. Some 5,000 contract miners averaged over \$3,000 annually because they took full advantage of their ability and opportunity to work. The operators cannot instill either the ability or inclination to work in laborers. They can show them that earnings are large and there is no underpayment, when work is performed regularly.

"Income of \$2,437 for contract miners working less than seven hours does not bear out Mr. Lewis' cry of underpayment. Nor does the average income of \$1,717 each year for the unskilled laborers indicate inability to make both ends meet. In view of the certified figures now available it is not strange that Mr. Lewis walked away from the facts at Atlantic City. He must realize, as do the operators, that the industry can not pay a 10 percent advance to contract miners and \$1 per day more to the day laborers. The public has had to look from the demagoguery of Mr. Lewis, bereft of facts, to the statements from the operators, bristling with facts, published without restraint, inaccuracy or deceit.



Preparedness

N. Y. Tribune

Between the two there can be but one decision—that the operators have convincing evidence, freely given, which shows that the industry can not permit a higher pyramid of anthracite wages than the present one, already higher, in relation to the pre-war period, than that of any other industry."

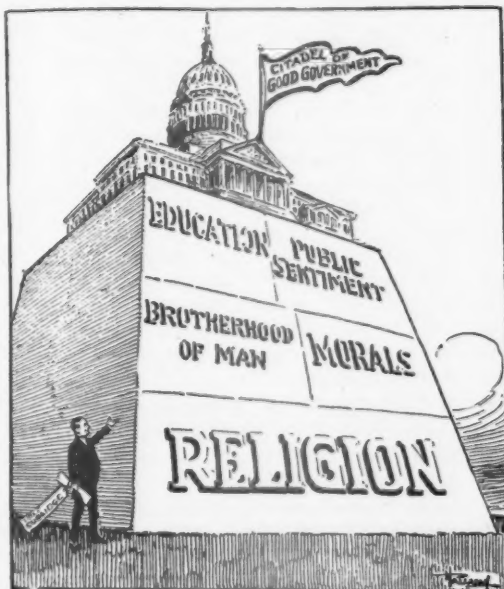
Predictions of prosperity for the United States have come thick and fast during the last few months. With steel as the usual business barometer, any

utterance of Judge Elbert H. Gary, chairman of the board of the U. S. Steel Corporation, is of unusual interest. In a statement before the American Iron and Steel Institute, Mr. Gary asserted that:

"We are on the eve of great prosperity and steel producers will be turning away business before the next annual meeting of the Institute.

"Steel industry has always been known as the barometer of trade, but sometimes I think it is the thermometer of trade. I think it is apt to be like the mercury of a thermometer going up and down, and one of the most serious and saddest things about our industry is that there is no reason why it should ever be 'in the dumps.'"

Comparatively few people realize how great is the Government's storehouse of information at Washington. Not only are there huge collections of books and other literature such as the Library of Congress but several specialized libraries exist in executive departments. The Department of Labor library is a collection of about 105,000 catalogued books and pamphlets, probably the largest library in the world of material on labor subjects and welfare work. Numerous bibliographies are prepared by this library on subjects of national importance including such phases of interest as workers' education, Federal control of child labor, minors in industry, minimum wage laws, convict labor, hours of work in relation to output, etc.



Providence Journal

As Coolidge Sees It

American bunker coal laden on vessels engaged in the foreign trade during the third quarter of 1925 amounted to 1,229,462 tons, compared with 1,147,997 tons in the preceding quarter and 933,567 tons during the first three months of the current year. While the Virginia customs district maintained its leadership in the United States coal-bunkering business, the amount supplied by that district (451,747 tons), was less than shipments during the second quarter, but more than those in the first three months.

The Coal Division, Bureau of Foreign and Domestic Commerce, Department of Commerce, is preparing for an early distribution of a coal exporters manual.

METALLURGY OF QUICKSILVER

A COMPREHENSIVE study of the metallurgy of quicksilver has been completed by specialists of the Bureau of Mines, attached to the Pacific Experiment Station, Berkeley, California. In the 75-year period ending with 1924 the United States produced 2,436,000 flasks of quicksilver worth \$121,191,000, state the investigators in a report recently published. California yielded the great bulk of this total; the remainder came from Texas, Oregon, Nevada, and Arizona. Most of this metal has been extracted from low-grade ores, those containing less than 0.5 percent mercury or 10 pounds per ton. The finished product or "virgin metal" is made at the mine and shipped in flasks.

Quicksilver is unique in being the only metal that is liquid at ordinary temperature. Because of this and other physical and chemical properties, it is one of the most indispensable metals to industry. On the other hand, the quicksilver industry of the world is of vanishing significance when compared to the major mineral industries with respect to quantity and value of product, capital invested, or the number of men employed. The peculiar value of quicksilver is due to the fact that in some of its applications no substitute is available and in others the substitutes would be unsatisfactory or extremely expensive. Scarcely a branch of science or industry fails to make some use of mercury or its compounds. As a detonator for explosives, mercury fulminate holds first place and in safety and reliability could be replaced only by the highly expensive silver fulminate. Through its use in detonators and in the metallurgy of the precious metals quicksilver is of special importance to mining. In medicine, in the manufacture of electrical apparatus, the production of pigments and anti-fouling paints, and the general field of experimental science quicksilver is equally indispensable.

Because of its small commercial importance and the lack of a stable market and price for the metal, the quicksilver industry, as a whole, has not had the benefit of the same metallurgical and business direction that has been given to the winning of the major metals. The unique relation of mercury to national health because of its use in certain drugs and to national security because of the need for quicksilver fulminate for defensive purposes and the indispensability of the metal and its compounds in science and industry seemed to justify investigation of the quicksilver industry by the Bureau of Mines. In Europe, government interest has been direct. The rich deposits at Almaden, Spain, are

owned and the product is marketed by the Spanish government; the mines at Idria, formerly belonging to the Austro-Hungarian government, have now passed under Italian control, and the most productive mines of the Monte Amiata district, Italy, which were largely owned by German interests, were taken over by the Italian government after Italy's entry into the World War. While under the control of the Austro-Hungarian government, the mines and reduction works at Idria employed a number of able engineers, and as a result, notable advances in the metallurgy of quicksilver were made there. In the United States the quicksilver deposits, which can supply domestic needs for many years to come, are, of course, privately owned.

The main conclusions to be drawn from the experimental work performed by the Bureau of Mines may be summarized as follows:

In the direct-furnace treatment of quicksilver ores the major problem in the extraction of quicksilver has been solved. Methods are available whereby low-grade ore can be treated with a remarkably high recovery and at low cost in view of the small scale of operations at most plants. It does not follow that present practice at all or even at the majority of the quicksilver reduction works in this country has reached the highest possible point of efficiency. Improvements can be made at many plants mainly by correcting minor defects rather than by making fundamental changes in the process used.

In the past the quicksilver industry has suffered from lack of competent technical supervision, and some time and effort have been wasted through attempts to devise improvements in process and equipment without adequate regard for developments in other branches of metallurgy. Now knowledge of the metallurgy of quicksilver has advanced so far that adequate information is available for the design, construction, and operation of a plant for the treatment of any ordinary mercury-bearing ore. Improvements in practice will consist mainly in applying available information more efficiently.

Mining of the ore offers the greatest opportunity for reducing production costs. To bring the ore to the reduction works generally costs two or three times as much as to treat it. This expense is due partly to the mode of occurrence of quicksilver deposits, and partly to the fact that mining operations are seldom conducted with maximum efficiency. Fluctuations in the price of and demand for quicksilver have tended

to prevent operators from carrying on development in advance of actual mining; in consequence, the planning of a systematic mining program has been impossible. As the outcome of activities during the World War, however, a number of properties now have fair quantities of ore definitely blocked out. The Bureau of Mines believes that the greatest opportunity for increasing the economy in quicksilver production lies in giving more attention to the geology of the deposits and the improvement of mining methods.

The results of this experimental work are contained in Bureau of Mines Bulletin 222, "The Metallurgy of Quicksilver," by L. H. Duschak and C. N. Schuette, which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of 30 cents.

X-RAY AND METAL STRUCTURE

THE Chief of Ordnance of the Army in his annual report says the metallurgical laboratory at the Watertown, Mass., arsenal has developed the x-ray in the investigation of steel and other metals. The research work has been along the line of utilizing the principal of refraction of the x-ray beam for the study of the composition and structure of metals.

The x-ray has been used in examination of metal castings and other material to locate defects not visible or otherwise discernible without destruction of the piece. With apparatus already available, this method has yielded practical results upon metal of 2½ inches thickness, and has been applied, not only to pieces of ordnance but, upon request, to various shapes for several commercial concerns. Castings and fittings for oil stills have been examined, defects pointed out, and means of remedy suggested. Examination is being made of each piece of the steam line for the new high-pressure steam power plant near Boston. Numerous other projects have been carried out successfully by the Watertown Arsenal laboratories in connection with the investigation of strength of materials and their resistance to various effects.

The thermal expansion of tungsten is one-third that of iron or ordinary steel for temperatures ranging between room temperature and 900 degrees Fahrenheit, according to the Bureau of Standards. This investigation was undertaken because tungsten is being used in the steel, electrical, dye, ceramic and chemical industries. Its physical and chemical properties make it an important metal in the metallurgical world.

LIST OF PERMISSIBLE MINING EQUIPMENT

A COMPLETE list of permissible mining equipment, rescue apparatus and gas masks tested prior to January 1, 1925, was published in Bureau of Mines Technical Paper 376.* The present list includes all equipment tested and approved by the bureau, up to and including September 15, 1925. It covers electric air compressors, coal drills, mining machines, mine pumps, room hoists,

switches, electric cap lamps, flame safety lamps, electric hand and trip lamps, flash lamps, methane indicators and detectors, blasting units, storage battery locomotives, power trucks, self contained oxygen breathing apparatus and gas masks.

The system under which these devices were tested permits the manufacturer, after his equipment has passed certain tests prescribed by the bureau, to mark

his equipment with a seal showing that it has been "approved" by the Bureau of Mines. The tests are designed to insure that the equipment has the minimum requirements for safety in use. The only object of the bureau in making such tests and publishing lists of permissible equipment is to safeguard the lives of workers and to help lessen the hazards of mining.

Permissible Mining Machines, Coal Drills Approved Under Schedules 2, 2A and 2B

Air Compressors

1. Type WK-26 compressor—30 horsepower motor, 250-500 volts, D. C. Approvals No. 117 and 117A issued to Sullivan Machinery Co., March 12, 1925.
2. Type WK-39 self-propelled compressor—30 horsepower motor, 250-500 volts, D. C. Approvals No. 120 and 120A issued to Sullivan Machinery Co., July 28, 1925.

Coal Drills

1. Type 2-BF drill—1 horsepower motor—80-110-250 volts, D. C. Approvals No. 109 and 109A issued to Chicago Pneumatic Tool Co., September 19, 1922.
2. Type CD drill—¾ horsepower motor, 110-230 volts, D. C. Approvals No. 110 and 110A issued to Martin-Hardscoog Co., September 16, 1922.
3. Type A-5 drill—3 horsepower motor, 110-250 volts, D. C. Approvals No. 119 and 119A issued to The Jeffrey Mfg. Co., April 15, 1925.

Mining Machines

1. Type CE-7 Ironclad shortwall mining machine—30 horsepower motor, 250-500 volts, D. C. Approvals No. 100 and 100A issued to Sullivan Machinery Co., September 30 and October 20, 1914.
2. Types 12-CC and 12-EC shortwall mining machines, 35 horsepower motor, 210-500 volts, D. C. Approvals No. 101 and 101A issued to Goodman Mfg. Co., May 20, 1916.
3. Type 35-B shortwall mining machine, 35 horsepower motor, 250-500 volts, D. C. Approvals 103 and 103A issued to The Jeffrey Mfg. Co., November 2, 1917.
4. Type CE-7 Ironclad shortwall mining machines, 30 horsepower motor, 220-440 volts, A. C. Approvals 104 and 104A issued to Sullivan Machinery Co., January 16, 1919.
5. Types 12-CJ and 12-EJ shortwall mining machines, 50 horsepower motor, 210-500 volts, D. C. Approvals 10 and 10A issued to Goodman Mfg. Co., June 21, 1920.
6. Types 112CC and 112EC shortwall mining machines, 50 horsepower motor, 210-500 volts, D. C. Approvals 106 and 106A issued to Goodman Mfg. Co., February 9, 1922.
7. Types 12-CC and 12-EC shortwall mining machines, 35 horsepower motor, 210-500 volts, D. C. Approvals No. 107 and 107A issued to Goodman Mfg. Co., February 9, 1922.
8. Types 112-CJ and 112-EJ shortwall mining machines, 35 horsepower motor, 210-500 volts, D. C. Approvals No. 108 and 108A issued to Goodman Mfg. Co., February 9, 1922.
9. Type 35-BB shortwall mining machines, 50 horsepower motor, 250-500 volts, D. C. Approvals No. 111 and 111A issued to The Jeffrey Mfg. Co., October 16, 1922.
10. Type 29-C arcwall mining machine, 50 horsepower motor, 250-500 volts, D. C. Approvals No. 112 and 112A issued to The Jeffrey Mfg. Co., March 13, 1924.
11. Types 212-EJ and 212-CJ shortwall mining machines, 50 horsepower motor, 210-500 volts, D. C. Approvals No. 113 and 113A issued to Goodman Mfg. Co., November 4, 1924.
12. Types 112-CK3 and 112-EK3 shortwall mining machines, 220-440 volts, A. C. Approvals No. 114 and 114A issued to Goodman Mfg. Co., February 7, 1925.
13. Types 112-CL3 and 112-EL3 shortwall mining machines, 220-440 volts, A. C. Approvals No. 115 and 115A issued to Goodman Mfg. Co., February 7, 1925.
14. Type 124-EJ slabbing machine, 50 horsepower motor, 210-500 volts, D. C. Approvals No. 118 and 118A issued to Goodman Mfg. Co., March 12, 1925.

*Crawshaw, J. E., Hsley, L. C., Parker, D. J., and Fieldner, A. C. Permissible Explosives, Mining Equipment, and Rescue Apparatus Approved Prior to January 1, 1925. Bureau of Mines, Technical Paper 376, 1925, 35 pp.

Room Hoists

1. Oaks safety room hoist, 5 horsepower motor, 250-500 volts, D. C. Approval No. 116 and 116A issued to South Fork Foundry & Machine Co., February 13, 1925.

Electric Switches, and Junction Boxes, Schedule 4A

1. Two pole fused switch enclosed—100 amperes, 600 volts, D. C. Approval No. 400A issued to Ohio Brass Co., August 5, 1925.

Electric Cap Lamps for Miners, Schedule 6A

1. Edison Model "C" lamp. Approval No. 10 issued to Edison Storage Battery Co., February 24, 1915.
2. Wico lamp. Approval No. 14, issued to Witherbee Igniter Co., June 10, 1916.
3. Wheat lamp. Approval No. 17, issued to Koehler Mfg. Co., Inc., September 23, 1919.
4. Edison model "E" lamp. Approval No. 18, issued to Edison Storage Battery Co., March 28, 1923.
5. RM-6 f. d. Ceag lamp. Approval No. 19, issued to Concordia Electric Co., August 2, 1923.

Flame Safety Lamps, Schedules 7, 7A and 7B

1. Koehler steel frame lamp—flat wick. Approval No. 201, issued to Koehler Mfg. Co., Inc., August 21, 1915.
2. Koehler steel frame lamp—round wick. Approval No. 201A, issued to Koehler Mfg. Co., Inc., July 29, 1918.
3. Koehler aluminum frame lamp—flat wick. Approval No. 203, issued to Koehler Mfg. Co., Inc., February 7, 1919.
4. Koehler aluminum frame lamp—round wick. Approval No. 203A, issued to Koehler Mfg. Co., Inc., February 7, 1919.
5. Wolf brass frame lamp—round wick. Approval No. 204, issued to Wolf Safety Lamp Co. of America, Inc., July 19, 1921.
6. Wolf aluminum frame lamp—round wick. Approval No. 205, issued to Wolf Safety Lamp Co. of America, Inc., April 24, 1924.
7. Wolf aluminum frame lamp—flat wick. Approval No. 206, issued to Wolf Safety Lamp Co. of America, Inc., April 24, 1924.

PERMISSIBLE METHANE INDICATORS AND DETECTORS

Approved Under Schedules 7B and 8A

Methane Indicators

1. Burrell indicator. Approval No. 800, issued to Mine Safety Appliances Co., March 10, 1922.

Methane Detectors

1. Wolf flame type detector. Approval No. 207, issued to Wolf Safety Lamp Co. of America, Inc., November 21, 1924.

Electric Hand and Trip Lamps, Schedule 10A

1. Type RMC-RMCT Ceag hand and trip lamp. Approval No. 1000, issued to Concordia Electric Co., May 25, 1922.
2. Model "E" inspection lamp. Approval No. 1001, issued to Mine Safety Appliances Co., July 28, 1925.

[Electric Flash Lamps, Schedule 11

1. Everready, safety type, flash lamp. Approval No. 601, issued to National Carbon Co., Inc., October 22, 1924.

Single-shot Blasting Units, Schedule 12

1. Attachment for Edison M-8 mine lamp battery. Approval No. 1200, issued to Mine Safety Appliances Co., May 24, 1920.

2. Davis No. O Magneto type blaster. Approval No. 1201, issued to Davis Instrument Mfg. Co., (Inc.), March 15, 1921.
3. Du Pont pocket magneto type blaster. Approval No. 1202, issued to E. I. du Pont de Nemours & Co., August 15, 1924.
4. Davis No. OO magneto type blaster. Approval No. 1203, issued to Davis Instrument Mfg. Co., (Inc.), October 17, 1924.
5. Attachment for Concordia type RM-6 f. d. mine lamp battery. Approval No. 1204, issued to the Concordia Electric Co., March 2, 1925.
6. Attachment for Edison model "E" lamp battery. Approval No. 1205, issued to the Mine Safety Appliances Co., April 28, 1925.
7. Everready dry cell blaster. Approval No. 1206, issued to National Carbon Co. (Inc.), August 20, 1925.

PERMISSIBLE STORAGE BATTERY LOCOMOTIVES AND POWER TRUCKS

Approved Under Schedule 15

Gathering Locomotives

1. Whitcomb E. S. B. flame-proof locomotive. Approval No. 1500, issued to Geo. D. Whitcomb Co., March 14, 1921.
2. Jeffrey type B. D. M. class 40 locomotive. Approval No. 1501, issued to The Jeffrey Mfg. Co., October 11, 1921.
3. Mancha flame-proof "Hercules" locomotive. Approval No. 1502, issued to the Mancha Storage Battery Locomotive Co., November 13, 1922.
4. Iron-ton type W. O. G. locomotive. Approval No. 1503, issued to the Iron-ton Engine Co., March 24, 1923.
5. Mancha Hercules A and AX locomotives. Approval No. 1505, issued to the Mancha Storage Battery Locomotive Co., April 5, 1924.
6. Jeffrey type B. D. M. class 25 locomotive. Approval No. 1507, reissued to The Jeffrey Mfg. Co., August 20, 1925.
7. Goodman type "10-30" locomotive. Approval No. 1508, issued to the Goodman Mfg. Co., March 21, 1925.

Power Trucks

1. Mancha "Power Tank." Approval No. 1506, issued to the Mancha Storage Battery Locomotive Co., May 5, 1924.

PERMISSIBLE SELF-CONTAINED OXYGEN BREATHING APPARATUS AND GAS MASKS

Approved Under Schedules 13 and 14A

Oxygen Breathing Apparatus

1. The Gibbs Mine Rescue Breathing Apparatus. Approval No. 1300, issued to Mine Safety Appliances Co., January 15, 1920.
2. The Paul Mine Rescue Breathing Apparatus. Approval No. 1301, issued to American Atmos Corporation, January 15, 1920.
3. The Fleuss-Davis Proto Apparatus. Approval No. 1302, issued to Siebe, Gorman & Co. (Ltd.), February 7, 1924.
4. The McCaa Mine Rescue Breathing Apparatus. Approval No. 1303, issued to Mine Safety Appliances Co., August 31, 1925.

Gas Masks

1. Burrell Ammonia Gas Mask. Approval No. 1401, issued to Mine Safety Appliances Co., April 10, 1920.
 2. M. S. A. Self Rescuer. Approval No. 1402, issued to Mine Safety Appliances Co., March 6, 1924.
 3. All-Service Gas Mask. Approval No. 1403, issued to Mine Safety Appliances Co., July 1, 1925.
- Reports of investigations, Bureau of Mines, Department of Commerce.



\$11,000,000 West Virginia Smokeless Merger Completed

The Massachusetts Gas Co.'s., through their subsidiary, the New England Fuel & Transportation Co., have purchased the E. E. White Coal Co.'s property at Glen White and Statesbury, W. Va.; the P. M. Snyder properties in Fayette and Raleigh Counties; and the distributing firm of Castner, Curran & Bullitt, Inc. About \$11,000,000 is involved in the transaction, which was brought about on the basis of the purchase of the stock of all of these companies for cash. It is stated that while the actual transaction will not take place until December 31, all arrangements have been perfected.

The E. E. White Coal Co. operates two of the largest mines in the Winding Gulf district, producing about 1,000,000 tons annually. They are among the finest equipped in the country.

The P. M. Snyder group of mines include the East Gulf Coal Co., the Pemberton Fuel Co., the Princewick Coal Co., the Long Branch Coal Co., and the Glencoe Coal Co. These mines have an aggregate annual tonnage of about 800,000 tons.

Castner, Curran & Bullitt, Inc., is a large distributor of Pocahontas and New River coals, said to be the first coal sales agency to handle the sales of West Virginia smokeless, and owns extensive docks in New England and a fleet of coal-carrying vessels, which also will be acquired by the new interests.

The Massachusetts Gas Cos. is a merger of New England public utilities, and its subsidiary, the New England Fuel & Transportation Co., operates extensive high-volatile gas-coal properties in the Fairmont field.

In the East the selling business of the merger will be conducted by the New England Coal & Coke Co., but in the West and in the export trade Castner, Curran & Bullitt will continue to do business under their old name, which is so widely known. It is the plan of the new interests to conduct all of the companies purchased under their present names, retaining the corporate identity of each, until a new company can be organized and financed to take over the old corporations.

These interests are said to have an option on another big coal producer in the Winding Gulf field, and it is under-

stood that they will acquire additional property in this section.

In discussing the merger E. E. White, president of the company which bears his name, stated that "It will be one of the biggest things that ever happened in West Virginia and means the beginning of a scheme whereby the bituminous fields one day will be in the same position as the anthracite fields are today—controlled by six or seven companies instead of by hundreds of companies. The biggest difficulty of the bituminous industry today is not production or transportation—it is selling."

Bon Air Coal & Iron Corporation

The \$25,000,000 merger of the Bon Air Coal & Iron Corporation and the Tennessee Consolidated Coal Company, of Chattanooga, has been consummated, it has been announced by T. R. Freston, a director. The combined interests will be completely reorganized and will be known as the Tennessee By-Products Co., with a capital of \$25,000,000.

The new corporation will be headed by R. J. Immerfall, formerly of the Victor Chemical Works, and his chief assistant will be Dr. W. B. Young, now general superintendent of the Bon Air Coal & Iron Corporation. The Tennessee By-Products Co. will manufacture charcoal, pig iron, methanol acetate of lime, wood oils, pitch, tar, ferro-phosphates, and mine extensively coal and iron.

Sues Government on Coal Claim

The Berwind White Coal Mining Co. has brought suit against the United States Government for the recovery of \$1,035,000 claimed to be due for soft coal taken by the Government during the war. The Government took 184,000 tons of coal and fixed \$740,000 as the price. The Berwind White Co. demanded \$1,591,000, basing the amount on the existing price for export coal. The Government has paid the company \$555,000 or about 75 percent of the price the Navy said it was worth and the suit is for the recovery of the balance claimed to be due.

New River Company Operating Coal Mines at Capacity

Current production at the mines of the New River Company in the smokeless district of West Virginia is bulking the largest in many months. With 14 mines

operating at capacity, output is running at the rate of better than 220,000 tons a month. The October output was slightly in excess of that figure, while November was expected to show better than 200,000 tons, the five Sundays and the one holiday being responsible for the decrease from October.

Want Pa. Miners' License Law Repealed

Attacking the miners' license law of Pennsylvania as "uneconomic and un-American," the National Founders' Association, in a resolution adopted recently, called upon its members resident in Pennsylvania to demand that the legislature repeal the law which prevents a man from digging hard coal unless he has had two years' experience in the anthracite mines.

Soft Coal Roads Get Cars

The anthracite railroads, it has been learned, are forwarding their surplus coal cars to bituminous coal roads as a means of relieving the congestion in soft coal territory. The Lehigh Valley and Lackawanna have already sent more than 2,000 cars each and expect to send more, while other roads, such as the Delaware & Hudson, have a large supply of cars available.

Reading Experiments With Coal Briquettes

The Philadelphia & Reading Coal & Iron Co., the operating company owned by the Reading Coal Corporation, has erected a plant in the anthracite fields to manufacture briquettes. Reading engineers have been making laboratory experiments with briquettes for some time. The principal difficulty in manufacturing has been in finding a binder for the coal dust or culm which will not soften in warm weather, which will prevent the briquettes from breaking up before they are consumed and which is odorless. The company is said to have millions of tons of culm available for manufacture of briquettes once the process has been perfected and actual commercial output started.

Virginia Coal Mines Working Day and Night

Almost every coal mine in Virginia is working night and day, and conditions are better than they have been since the World War, it was stated by A. G.

Lucas, chief mine inspector for the State Bureau of Labor and Industry.

"The mines are working better today than I have seen them since the big boom during the war," said Mr. Lucas. "There is plenty of opportunity for all of the miners of Virginia to work as much as they want to, and room for more to go into the mines than are now working there," he declared. "Good men are getting from \$6 to \$10 for an 8-hour day."

The big boom in the Virginia coal mines may be partly attributed to the long strike of the anthracite miners, which is still on, and also to the protracted drought of the past summer, which has caused many industrial plants to use steam power because of the lack of water to generate electricity.

Ohio River-Lake Erie Canal Urged as National Project

Hearings on the question of building the proposed Ohio River-Lake Erie ship canal to connect the Ohio River and the Great Lakes waterway systems was held in Youngstown, Ohio, November 9, by United States Army engineers. Robert I. Randolph, Chicago, consulting engineer of the canal board, contended at the hearing that the estimate of fixed charges for operating the canal, made by the United States engineers, was too high, the estimated transportation saving too low, and that instead of an annual operating deficit of \$378,000 there should be a saving of more than \$2,000,000.

He contended that the evidence fully justified the building of the waterway as a national undertaking. Representatives of steel companies and bankers were present at the hearing. The estimated cost of the canal is slightly in excess of \$100,000,000.

De Bardeleben Coal Corporation

The stockholders of the De Bardeleben Coal Corporation, Birmingham, Ala., have approved a new financing plan adopted by the board of directors of the corporation providing for the issuance of \$1,500,000 in bonds, which it is understood is to provide for refinancing and also betterments and improvements to be made in the future. All of the corporation's mines are operating on a full-time basis.

The Coal Mining Institute of America will hold its annual meeting at Pittsburgh, Pa., December 9 to 11.

Frank Nelson, Jr., was reelected president of the Alabama Mining Institute by the board of governors. C. A. Moffett was elected vice-president and James L. Davidson reelected secretary.

Harlan County Coal Operators Meet

The Harlan County Coal Operators' Association met in their annual business session at Harlan, Ky., November 18. R. C. Tray, after seven years as president, declined reelection, and was succeeded by W. A. Ellison, vice-president, Mahan-Ellison Coal Corporation, of Harlan. J. P. Johnson, general manager, Crummies Creek Coal Company, Cawood, Ky., was elected vice-president. Secretary Clayton's report showed the association to be in strong condition.

In the afternoon all of the operators and guests were taken on a special train to Lynch, Ky., for inspection of the mine of the United States Coal & Coke Company, which included seeing a combination cutter, conveyor, and loader in actual operation.

At the banquet held in the evening, W. A. Northcutt, of Louisville, general solicitor of the L. & N. Railroad, spoke on the development of the coal industry in Kentucky and Tennessee and urged a close relationship between operators and the road. George W. Malcomson, Detroit, Mich., president, Harlan Gas Coal Company, spoke of the necessity for trade extension and service work, and told of the proposed organization of a fuel research institute in Detroit. Harry L. Gandy, executive secretary of the National Coal Association, spoke on the work of that organization and the congressional situation.

Southern Appalachian Coal Operators' Association

C. W. Henderson, president, Cambria Coal Mining Company, of Knoxville, was reelected president of the Southern Appalachian Coal Operators' Association at the annual meeting in Knoxville recently. Broadening of the statistical work of the association was authorized. The report of Secretary Howe showed increasing membership and a strengthened position of the local association. J. E. Johnson, secretary, Kentucky Mine Owners' Association, briefly told of the efforts of that association in combating a tonnage tax proposal in Kentucky, inasmuch as quite a portion of the operations of the Southern Appalachian Association is in that state. A meeting of the Southern Appalachian Efficiency Association, an auxiliary of the local operators' association, was also held, at which E. V. Albert, superintendent, and A. G. Hahn, mine inspector, United States Coal & Coke Company, Lynch, Ky., discussed safety efforts.

British Mining Officials in U. S.

Extension of the cooperative work between the Mines Department of Great Britain and the Bureau of Mines of the United States would be helpful to the

coal industry of both nations, in the opinion of five prominent operators of British collieries who were in Washington November 25 for a conference with officials of the Department of Commerce and the National Coal Association. Benefits to the British and to the American industry have already resulted from the basic research work conducted through the present cooperative program. For the purpose of making a first-hand study of the latest developments in American coal mining machinery, the Britishers will visit the producing fields of Pennsylvania, West Virginia and Ohio. They were guests of the Bureau of Mines at the Pittsburgh Experiment Station where a chemist of the British Mines Department is now engaged in research work under the cooperative agreement, and will also inspect the low temperature carbonization plant of the Ford organization at Detroit. The members of the party are: Charles Reid, manager of the Fife Coal Co.; William Telfer, manager of the Coltness Coal & Iron Co.; Charles Howson, manager of the Dorman-Long Co.; Capt. S. Walton Brown, director of the Seghill Collieries Co.; M. J. Foggo, manager of the Cannock Chase Collieries Co.

Colorado Oil Shale Properties Attracting Attention—Standard Oil Invests \$500,000

Oil shale development in western Colorado is attracting more than ordinary attention at the present time, and a number of important deals have taken place recently or are now pending.

The prediction is being freely made that development of the shale lands will begin on a commercial scale in the not far distant future.

The Standard Oil Co. of New Jersey, largest of the Standard companies, has become the largest single owner of oil shale lands in western Colorado.

Thirty thousand acres of shale land in Garfield County is owned, it has been learned, by the Standard Development Co., a company organized by Walter Teagle, president of the Standard Co. of New Jersey, and associates.

The 30,000 acres, say men familiar with the subject, represent an investment of at least \$500,000, if not more. The land, located north of the town of DeBeque, is considered among the finest shale land of the state. It contains enough oil, in the opinion of experts, to insure the big Standard Co. an almost unlimited amount of oil whenever the known fields have been exhausted and the people turn to shale.

The land is now standing in the name of L. P. Lyons, of Glen Springs. For more than three years, Lyons, his identity as a representative of the Stand-

ard Oil Company of New Jersey concealed, has quietly bought tract after tract. Only recently the identity of his backer in his enormous purchases has become known.

Victor C. Alderson, Sc. D. formerly president of the Colorado School of Mines, announces that he has opened offices in the Symes Building, Denver, and will devote his attention to the development of the oil shale industry.

Ray-Nevada Merger Delayed by a Suit

Stockholders meetings of the Ray Consolidated Copper and the Nevada Consolidated Copper companies to act on the proposed sale of the assets of the Ray to the Nevada company, postponed until November 24, were again postponed to December 8, to await court action started in New York by Frank C. Armstrong of that city to prevent the merger.

Directors of the two corporations agreed on the plan on a share-for-share basis, but Armstrong contends the Ray Company has the higher property and should receive a higher price.

Executives of the companies asserted that the allegations set forth in the restraining order were without foundation, and it is expected that the matter will be promptly disposed of in the courts.

Announce Alaskan Development Plans— Exploration Company to Rework Old Placer Claims

Alaskan placer miners have simply scratched the surface. Modern methods and machinery will take out fortunes they left behind, according to Norman C. Stines, manager of the Fairbanks Exploration Co., subsidiary of the United States Refining & Mining Co. of Boston. The Fairbanks Company has announced a \$9,000,000 development project for the Fairbanks district.

Reworking old placer claims with modern machinery will be the main undertaking of the company which will employ 400 men for several months a year and 160 the remainder.

Already the company has spent \$1,500,000 on the ground, Mr. Stines declared. "All the money is private capital. We do not expect a cent of return on the investment until 1930," he stated.

To get the gold an 80-mile ditch will be constructed next summer to bring water from the Chamtamka River to Fairbanks, Stines said.

The Government railroad in Alaska should not be abandoned, he said. His company will ship 12,000 tons of building material to Fairbanks during the next three years and later. When capacity operations are reached 8,000 tons of coal will be shipped in annually, he said.

Report Progress in Bringing Zinc Miners and Smelters Together

The meeting in St. Louis November 6 of the directors of the American Zinc Institute was the largest in point of attendance since the organization was formed. This was preceded by a meeting of the committee of six, commonly known as the "Fence Committee," which was appointed last spring at the annual meeting of the Institute to compose the existing differences between the zinc miners and smelters. In reporting to the Board of Directors, the committee advised that they had increased their number to ten and that they felt very much encouraged with the progress accomplished in solving the problems that had been placed before them.

At the meeting of directors A. J. McKay, president of the Matthiessen-Hegeler Zinc Co. was elected a director to fill the vacancy created by the resignation of F. W. Holler.

It was decided to hold the 1926 annual meeting of the Institute in St. Louis on April 19 and 20, and plans were approved to exhibit the products of the zinc industry at the Sesquicentennial Exposition at Philadelphia in 1926 under the auspices of the Institute.

It was voted to release the slab zinc statistics, which are compiled by the Institute, monthly by night letter on the ninth of each month, to be followed by a mail summary. Authority was also voted for the prompt completion of a handbook and for the preparation and publication of a treatise on zinc.

There was a discussion of the several activities in which the Institute is engaged upon for promoting the use of better galvanizing material.

Zinc Export Association Organized

It has been officially announced that the Zinc Export Association has been organized, incorporated under the laws of Delaware.

The following are officers and directors: President, A. J. McKay; vice-presidents, B. N. Zimmer and Chas. T. Orr; treasurer, Wm. A. Ogg; secretary, Carl Klaustermeyer.

Directors: A. J. McKay, Matthiessen & Hegeler Zinc Co.; B. N. Zimmer, American Metals Co.; C. T. Orr, Athletic Mining & Smelting Co.; W. A. Ogg, American Zinc, Lead & Smelting Co.; C. Klaustermeyer, Crasselli Chemical Co.; J. G. Starr, Quinton Spelter Co.; B. Lissberger, United Zinc Smelting Corporation; L. E. Wemple, Illinois Zinc Co.; H. H. Roseland, Hegeler Zinc Co.; C. W. Martin, American Zinc Products Co.

The association has been formed for the purpose of increasing the exportation of slab zinc from the United States to foreign countries.

Predicts Big Gain in Zinc Shipments from Coeur d'Alenes

Mining and milling conditions will be improved by next summer so that the shipment of 50,000 tons of zinc concentrates yearly from the Coeur d'Alene region will be possible, according to Frank M. Smith, smelter director of the Bunker Hill & Sullivan, while addressing the mining bureau of the Spokane Chamber of Commerce recently.

Mr. Smith had in mind larger output from the Star mine of the Sullivan Mining Co., which is undergoing development, and of increases from the several other shippers including the Constitution, Highland-Surprise, Nabob, Sidney, and Tamarack & Custer. The Nabob is the only shipper of crude ore, but the Constitution may ship crude in addition to its concentrates.

Sees Bright Outlook for Copper, Lead and Zinc

J. E. Jackson, of the London, England, Exploration Co., was in Butte, Mont., the middle of November looking over the properties of the Anaconda Copper Mining Co. The mining operations in the Butte district are looked upon as a model throughout the world, he said. Mr. Jackson has been in this country for the past three months, and says that his observations are that there will be a decided advance in copper prices in the spring and that the demand for lead and zinc in 1926 will be the biggest in history, under normal conditions.

International Nickel Has British American Nickel Property

The International Nickel Co. is reported to have control of the property of the British-American Nickel Corporation which was the third largest producer of nickel up to the time it got into financial difficulties. In a sale forced by the bondholders last June, it was sold for \$5,000,000 to Dyce W. Saunders of Toronto, acting in behalf of the Anglo-Canadian Mining & Refining Co., Ltd. The International Nickel Co., Ltd., of Canada is said to have acquired the properties with the exception of the refinery at Deschener.

The property consists of a lowgrade copper-nickel ore deposit; a modern and well-equipped surface plant and smelter, all within two or three miles of the International's smelter at Copper Cliff.

Miners' Wages in Coeur d'Alenes Advanced 50 Cents Per Day

On November 16 wages of all employees of the mining companies of the Coeur d'Alene district of Idaho were advanced 50 cents per day, and henceforth will be adjusted on the first of each month, based upon the average price of lead for the preceding month. Under

the new sliding scale worked out by the mining companies the basic rate of wages for miners is \$3.75 when lead is under 5½ cents per pound, and a bonus of 25 cents is added for each increase of half a cent per pound in the price of lead. The present price of 9½ cents makes the wage for miners \$6 per day.

The sliding scale for the adjustment of wages adopted by the mining companies of the Coeur d'Alenes in 1916 has long been inoperative on account of the higher levels of the price of lead and also the high cost of living. For this reason the mining companies worked out a new sliding scale, which it is believed will operate fairly alike to employers and employees.

Wages in this district were already higher than in any other district in the western mining states.

Depletion Reserve Declared Taxable— Supreme Court Upholds Income Levy on Phelps Dodge 1917 Extra Distribution

In a five to four decision handed down in the Douglas tax case the United States Supreme Court, holding that shareholders of the Phelps Dodge Corporation of New York must pay income taxes on the extra distribution of 1917, laid down the principle that such a distribution from a "depletion reserve" must be regarded as income and taxable as such and not construed as a "capital return" exempt from taxation, as contended by the defendant.

The opinion was read by Associate Justice Brandeis, whose views were concurred in by Chief Justice Taft and Associate Justices Holmes, Sanford, and Stone. Associate Justices Vandevanter, McReynolds, Sutherland, and Butler dissented.

The case was brought on behalf of the Government by William H. Edwards, collector of internal revenue, to enforce collection of income tax on the estate of Dr. James Douglas, of New York City.

The amount of the tax involved was \$173,579.72, which the Treasury Department imposed upon the sum of \$328,400, representing the amount of two cash dividends declared by the Phelps Dodge Corporation, which is engaged in the business of mining copper and coal, and paid to Dr. Douglas in 1917. Dr. Douglas paid the tax under protest.

The decree of the district court in New York upholding the amount of tax assessed was sustained by the Supreme Court, which reversed the judgment of the Circuit Court of Appeals.

Engineer Says Selective Flotation Will Give Access to 100,000,000 Tons of Ore in Colorado

Colorado has not less than 100,000,000 tons of silver, lead, and zinc ores exposed in her mines or on mine dumps,

and the new selective flotation process of refining will turn those ores into cash in the next few years, according to Robert A. Wilson, mining engineer of New York City, who has been traveling over Colorado three months visiting scores of mining camps at the behest of eastern capital.

"For 25 years the silver, lead, zinc ores of Colorado have been neglected," said Wilson, "not because we did not know they were here, but because we could not refine them at a profit.

"But a new era is opening—in fact, it has already opened—by the selective flotation process for refining ores that for years have been commercially worthless."

Bunker Hill to Build Pine Creek Tramway—Constitution May Build Another or a Connection

It has been announced that a main trunk line aerial tramway, 4 miles long, will be constructed by the Bunker Hill & Sullivan Mining and Concentrating Company from the Sidney mine to a point at the head of Government Gulch, in Pine Creek district, Idaho, where it is reported Bunker Hill will erect an electrolytic zinc plant.

An additional aerial tramway may be built from the Constitution mine either to the terminus of the Sidney tram or to a point near the Bunker Hill plant.

According to R. W. Nuzum, a member of the Constitution's board of directors, the proposed tramway, if built to the Bunker Hill, would be about 7 miles long and cost approximately \$100,000. It would pass near the property of the Highland Surprise.

Construction of the Constitution tramway is not certain, and at any rate will not be started until early spring. The Sidney tram, however, will be rushed to completion, according to information made public.

By the construction of laterals it will be enabled to haul ore from other mines in the Pine Creek District.

New Steel Process Produces Direct from Ore in Electric Furnace

An electrical process, discovered and developed in Sweden, may make possible the production of iron and steel direct from the ore, according to the Utility Bulletin of the New York State Committee on Public Utility Information.

Three years of experiment at the Royal Technical High School at Stockholm and at the Hagfors iron works have shown that iron ore and coal, mixed and fused in an electric furnace, produce pure iron, containing only .02 percent of carbon, and steel that may be worked in the usual manner. The process is continuous, and fusing ceases only temporarily when the furnace is

tapped, while the absence of gases and slag results in a superior product.

An electrical furnace of commercial size has been built at the Hagfors works and it is reported the new process is commercially practical.

Mexican Mining Deal Announced

The American Metals Company has announced that its Mexican subsidiary has closed a contract for the entire output of the lead and silver of the Cia Internacional Minera Sociedad Anonoma mines in Mexico. In addition, the corporation is building a new smelting plant at Zacatecas to take care of this ore, which will give it three lead and silver smelters in Mexico and the only lead-silver refinery in that country.

The Idaho Premier Lead Mines of Coeur d'Alene City, Idaho, with offices at Spokane, has through C. A. Gray, manager, negotiated the sale by lease and bond to George W. Maurer, and his associates of New York, of seven of the company's claims or approximately 140 acres in the head waters of Burnt Cabin Creek, for \$125,000.

The property is located about 25 miles northwest of the Bunker Hill & Sullivan mine at Kellogg. Maurer and his associates plan on installing machinery and equipment to quickly develop the property to a producing basis, starting early in the spring.

Canadian Asbestos Merger

The Asbestos Corporation of Canada has issued a statement giving terms of the proposed merger by which seven asbestos companies would be combined. A general meeting to vote on the merger was called for December 18.

The companies in the merger are: Asbestos Corporation of Canada, Consolidated Asbestos, Federal Asbestos, Thetford Vimy, Maple Leaf Asbestos Corporation, Asbestos Mines, and the Black Lake Asbestos & Chrome Company.

Sues Anaconda on Patent

Alleging infringement of patent rights to a flotation process, the Metals Recovery Company, with headquarters in New York, has brought suit in the Federal court at Butte against the Anaconda Copper Mining Company. The complaint asks for a temporary injunction against Anaconda pending the hearing of the suit and a permanent injunction afterwards.

Protests Increase in Freight Rates on Raw Materials

J. F. Welborn, president of the Colorado Fuel & Iron Company, testifying before the Interstate Commerce Commission at its hearing in Denver on the ap-

plication of western roads for permission to increase their freight rates 5 percent, said that his company was protesting against any increase in rates on raw materials moving into its plants. There was no objection to an increase on finished products, provided the same increase applied to competitors in the eastern territory.

He testified that the company was at a disadvantage in the Pacific coast markets due to the rates from the Pittsburgh district via the Panama Canal to the coast being lower than the rail rates from Minnequa to the same destination.

Traffic Manager Wire testified that the proposed increase would add a freight burden of \$306,000 a year to the company's operating costs on raw material moving in, and that if no advance on finished products moving out of eastern and southern districts to the coast was made that the Colorado Fuel & Iron Company's disadvantages in that territory would be correspondingly increased.

Nitrate Deposit in Arizona

A large deposit of nitrate is reported to have been discovered near Aravaipa Canyon, about 70 miles northeast of Tucson, Ariz. The deposit shows a width of 20 feet where cut by the canyon and a distance of 3 miles along the course of the canyon. It is expected to prove of great value, as nitrates are not over plentiful in the United States.

Hanna Company to Take Over Rogers-Brown Ore Properties

The Hiawatha and Rogers mining properties of the Rogers-Brown Ore Company, of Buffalo, have been taken over by the M. A. Hanna Company, and will hereafter be operated by that concern, according to a dispatch in the Duluth News Tribune. The Rogers mine has been idle since May 4, 1925. Retimbering of the shaft is now in progress, and general repairs are being made to all equipment, so that the property will be ready for active operation early next January.

With the acquisition of the Rogers and Hiawatha mines, the Hanna Company becomes the largest operator in the Iron River, Mich., district. Between 300 and 400 men will be given employment at both mines.

Wyoming High in Oil Output

Wyoming is now the fourth state in the Union in the production of petroleum and sixth in the production of natural gas. Development of these resources during the two years ending September 30, 1924, is recorded in the twelfth biennial report of Albert S. Bartlett, state geologist of Wyoming.

The report gives a correlation table

showing the geological formation in the producing areas and tabulations of Wyoming oil structures. These tabulations show for each field the major and minor producing sands, approximate producing area, surface formation, deepest sand tested, structural conditions, and some remarks on drilling activities. The report also includes a list of oil refineries, gasoline plants, and pipe lines in the state.

New Oil Refining Process

A dispatch to the Oil City, Pa., Derrick, from Casper, Wyo., says a discovery that appears to be one that will revolutionize the refining of oil has been made in Denver by two chemists of the Western Minerals Company. By the use of a reagent, crude oils, kerosene and shale oils have yielded much larger quantities of gasoline than was considered possible heretofore.

This discovery was made through the making of experiments to find a new filter that would replace fullers earth in the filtering of oils.

The sixth annual meeting of the American Petroleum Institute will be held January 19, 20, and 21 in Los Angeles, Calif.

Analysis of Alabama Coals

Information regarding the analysis, heating value, and other characteristics of numerous Alabama coals is given in Technical Paper 347, just issued by the Bureau of Mines.

The coal-bearing rocks of Alabama form the southern end of the Appalachian coal region, and are naturally divided into four more or less completely separated fields, which are, in order of importance, the Warrior, Cahaba, Coosa, and Plateau, the Bureau of Mines points out.

The Warrior field is the greatly expanded southern end of the Appalachian region. It occupies all or parts of Jefferson, Walker, Tuscaloosa, Fayette, Marion, Winston, Cullman, Lawrence, and Franklin counties, but the main productive part includes only the first four of these counties. Its known area is computed to be 4,000 square miles, but as it extends westward and southward an unknown distance beneath the cover of younger rocks, its probable area is much greater. The Cahaba is a long narrow field extending northeast-southwest and lying about 7 miles southeast of the Warrior field, from which it is separated by Birmingham Valley. Its length is about 60 miles and its general width 5 or 6 miles, but at its southwest end it expands to a width of 15 miles. Its area is about 350 square miles. The Coosa field lies 2 to 5 miles southeast of the Cahaba field, from which it is separated by Cahaba Valley. It is also long

and narrow, having a length of 51 miles and a width of about 5 miles. The Plateau field is less well defined by natural boundaries than the others, being a part of the northwestward continuation of the Warrior field.

Coal production in Alabama during 1924 amounted to approximately 19,500,000 tons. Over 99 percent of the coal mined is derived from the Cahaba and Warrior fields; the production of the Warrior field approximates six to seven times that of the Cahaba.

The coal is used for steam, coking, and domestic purposes, and is consumed mostly within a comparatively short distance from the mines, about 85 percent being consumed in the state by the railroads.

About 50 percent of the coal produced in the state is cleaned before shipment; washeries and mechanical cleaners are extensively used. About 35 percent of the annual coal output is manufactured into metallurgical coke and by-products. The bulk of the coke made is used mainly in the blast furnaces of the Birmingham district, which is the center of the iron and steel industry of the south. Most of the coking coal comes from the beds of the Warrior field.

Mining is done in more than 30 workable beds which range in thickness from about 2 to 10 feet, with an average thickness of 4 feet.

In Alabama 45 to 60 percent of the coal is usually extracted in first mining. The percentage of recovery ranges from 65 to 90 percent, but the average can reasonably be placed at 75 percent.

In addition to detailed tables giving results of analysis of numerous coals as determined by the Bureau of Mines, Technical Paper 347 includes a chapter on the geology of the coal fields of Alabama, statistics relative to coal production in that state, and a description of the mining methods employed in the state.

One of the important functions of the Bureau of Mines has been the analyzing of samples of coal from every coal-mining state and from Alaska. The analysis are being published for the information of government officials and the public. The results of these analysis are being incorporated in a series of inexpensive publications, by separate states. The paper dealing with Alabama coals is fifth of the series, papers relating to the coals of Iowa, Kentucky, Ohio, and Utah having already been published. Reports dealing with the coals of Tennessee, Virginia, and Missouri will shortly be issued.

Copies of Bureau of Mines, Technical Paper 347, "Analysis of Alabama Coals," may be obtained from the Superintendent of Documents, Washington, D. C., at a price of 15 cents.



WITH THE MANUFACTURERS



New Oil-Electric Locomotive

The recent purchase of a 60-ton oil-electric locomotive by the Central Railroad of New Jersey, followed closely by the acquisition of a 100-ton type by the Long Island Railroad, marks a new era in railroad engineering.

The oil-electric locomotive, with its internal combustion engine and electric generator, is the product of three of the leading manufacturers in the engineering field—the American Locomotive, the General Electric, and the Ingersoll-Rand Companies.

The oil engine, which is the product of the Ingersoll-Rand Co., has six cylinders and is of the 4-cycle, single-acting vertical type. Fuel oil is injected directly into each cylinder through two opposite spray nozzles situated in the combustion chamber. This fuel is delivered, under pressure, by a pump directly connected with the main shafting. The heat resulting from sufficient compression ignites the oil and the power stroke is thus started; in other words, the action is similar to that of an ordinary automobile engine with the heat of compression doing the work of the spark plug. The pump which injects the oil serves all six cylinders, and is automatically controlled to feed each chamber as oil is needed. For efficient action the engine requires that the oil have a flash point of not less than 150° F. A forced-feed system of lubrication is used and functions through a gear-driven pump in the crank case. Circulating water is distributed to all parts of the engine by a centrifugal pump attached to the crank shaft.

To start the engine compressed air at a pressure of 200 pounds is admitted successively to each cylinder through mechanically operated starting valves. In order that there be a continuous supply of starting air two small compressors are provided, one driven by an auxiliary engine and the other by the main oil engine. The latter compressor keeps the flasks of starting air continually charged.

Directly connected with the oil engine is a General Electric generator, with a voltage ranging from 200 to 750. The output is regulated by throttle to the demands made upon the dynamo by the tractive motors.

The control of the locomotive is extremely simple. The engineer has only to manipulate two control handles. One that serves as a throttle lever to con-

trol the output of the engine, while the other is a master controller or electric switch which puts the tractive motors either in series or in parallel as circumstances may require.

Therefore with the throttle lever set at any desired speed, the generator delivers to the four driving motors the amount of energy necessary to turn the driving wheel at the prescribed speed. The tractive efforts can thus be varied to suit any operating condition.

Up to date these oil-electric locomotives have been constructed for both slow-speed switching and for road service. Two slow-speed types have been built weighing, respectively, 60 and 100 tons, and capable of developing 300 H. P. and 600 H. P. The smaller is capable of traveling at 30 miles an hour and exerts a tractive effort of 36,000 pounds. The larger unit can make the same maximum speed and develop a tractive effort of 60,000 pounds.

Designs have been developed for two road types. The 60-ton road locomotive will have a tractive effort of 23,000 pounds, develop 300 H. P. and have a maximum speed of 45 miles per hour. The larger type would weigh 85 tons and be able to make 55 miles an hour. The latter unit would develop 600 H. P. and exert a tractive effort of 50,000 pounds.

Performance reports disclose that the oil-electric locomotive is far more economical in cost of operating than a steam locomotive of the same capacity. In the first place, the thermal efficiency referred to the driving wheels of an internal combustion engine driven electric locomotive is approximately 25-27 percent. Steam locomotives can show only 5 percent to 8 percent. The interposed system of electric drive used in the new oil-electric locomotive protects the engine from the strains and shocks that a steam engine would have to contend with because of direct drive. Also this absence of direct drive permits the engine to run at its most efficient and therefore at its most economical speed; and the dynamo tractors, providing the equivalent of countless gear changes. And last, but not the least of the merits of the oil-electric locomotive, is the way the generator and driving motors automatically adjust themselves in response to the demand made upon them.

The last few years have witnessed the gradual disappearance of steam in many industries. Electricity has frequently taken its place. But apart from what

the oil-electric locomotive represents as a notable advance in railway engineering, the development of this type of tractor promises to prove a source of great relief to thousand of people now living close to railroad terminals, where they are exposed to smoke and to the noisy din of active or waiting locomotives.

For Making Load Surveys

The Type B-2 thermotol is a new General Electric load indicator for 60-cycle, 2,300-volt, subway type distribution transformers from 15 to 200 kv-a. inclusive. This instrument is similar to the thermotol for pole type transformers and was designed as a convenient and reliable means of making load surveys.

It is designed to factor all the several variables on which the output of a transformer depends, including (1) the kv-a. rating of the transformer; (2) the load; (3) the duration of the load, and (4) the temperature of the surrounding air, usually referred to as the ambient temperature. The percentage of available transformer output which is being utilized is also indicated.

This instrument indicates underloaded as well as overloaded transformers, together with load conditions at the time of resetting, and exposes an easily distinguishable danger signal when safe load conditions are exceeded. An important feature is the ability to differentiate variations in ambient temperature accurately.

The device consists essentially of two thermometers connected in series; one, of the capillary tube type, is immersed in the oil, and the other, of the bimetallic type, is located in the external case and acts as a corrective for the ambient temperature. The combination actuates the hand and danger signal.

The external case is of brass, finished in black baking japan and thermally insulated from the radiant heat of the transformer by a metal screen and air space. This case is riveted to a bronze casting through which the capillary tube passes.

Installation requires but the removal of the lower oil sampling plug, after which the thermotol, which is provided with the necessary fitting, is screwed in. An auxiliary sampling plug is also provided on the instrument to permit the checking of the oil level in the transformer as before.

The hand is of the maximum reading type and records the maximum percent-

age of the transformer's capacity which has been utilized since the last resetting, the scale being graduated to read between 50 and 125 percent transformer capacity. The semaphore indicating an overloaded transformer is normally not in sight until 100 percent of the transformer capacity has been exceeded, when it drops into view.

The Texrope Drive

An important development in the field of power transmission machinery has been announced by the Allis-Chalmers Mfg. Co., who have recently perfected an entirely new type of short center, flexible drive, known as the Texrope Drive.

The Texrope Drive consists of two grooved sheaves and a number of specially constructed endless "V" belts. The sheaves are set just far enough apart so that the belts fit the grooves without either tension or slack.

Previously no short center drive existed which did not have slip, backlash or lost motion, which caused jerky starting and uneven running. Since the Texrope belts just fit the sheaves, there is no slack or lost motion in the drive. Because of the "V" construction they cannot slip, as the harder the pull the more firmly the belts grip the grooves. Being elastic and stretchable, they cannot jerk, either in starting, acceleration or running, nor can they transmit vibrations, but act as cushions between the driving and driven machines. Therefore smoothness of transmission never attained before is delivered by the Texrope Drive, as opposed to the series of linear pulsations delivered by the ordinary short center drive.

Bearing pressures are low, since no belt tension is employed. The drive occupies very little space. It is silent, perfectly clean, unaffected by moisture or dirt, and is safe, simple and trouble proof. Since there is no slip, the speed ratios are fixed and exact. It is durable, and each belt carries its proportional share of the load.

Texrope Drives from $\frac{1}{2}$ to 250 H. P., with ratios up to 7 to 1 and belt speeds from 800-6,000 feet have already been placed in service. They have been applied to nearly every industry, notably textile machinery, fans and blowers, machine tools, food manufacturing machines, refrigeration, mining, crushing, wood and metal working machinery, elevators and conveyors, paper, flour and rubber mill drives, etc.

A New Position Indicator for Enclosed Circuit-Breakers

A device which automatically indicates the position of the main circuit contacts of a totally enclosed, water-tight circuit breaker without the cover being re-

moved or the casing in any way disturbed, has been devised and is used on the new F-11 subway oil circuit-breaker by the Westinghouse Electric & Manufacturing Co.

The device consists primarily of a plug, similar to the ordinary plug used on seal breakers, which screws into the case. Slots on the inside of the plug correspond with the open or closed positions of a pin fastened to the breaking mechanism arm, and the plug can only be inserted when correct coordination of the slots and pin is made. The outside of the plug has molded in its surface the words "open" and "closed," either of which is at the top when the breaker is in the corresponding position.

The new device will save considerable time and annoyance to operators where frequent changes must be made of interrupters located in tunnels or other places where water-proof cases are necessary, as it is impossible, with the ordinary case, to ascertain without removing the cover, in what position the breaker is set.

New Washington Plant Installed

The first plant washing bituminous coal by the Chance sand flotation process is located in Pennsylvania on the main line of the Pennsylvania Railroad at Mt. Union. At this point coal from the Broad Top Coalfield, distant some 30 miles, is transferred from narrow gauge cars of the East Broad Top Railroad & Coal Co. to broad gauge cars for shipment to market. The tipples by which this transfer is effected, contained sizing screens and picking tables, and was recently remodeled by the addition of two sand flotation separating cones each 10 feet in diameter. In operating this plant coal larger than $4\frac{1}{2}$ inches (lump coal) is hand-picked, coal from $4\frac{1}{2}$ inches down to $\frac{3}{8}$ inch is washed in the cones, and coal smaller than $\frac{3}{8}$ inch, being sufficiently free from impurities, is not washed but is by-passed and shipped with the washed coal. One of the cones is used to wash domestic coal of egg to range size, the other cone to wash stoker coal through 1 inch. Of the total tonnage prepared by the plant from 50 to 55 percent is passed through these two cones.

The plant was placed in operation October 1, 1925, and between that date and October 21, comprising 15 working shifts, over 40,000 tons was shipped to market.

The Dorr Company, engineers, 247 Park Avenue, New York, has announced the appointment of E. L. Bateman, The Corner House, Johannesburg, as sole agent for their equipment in South Africa.

Fiftieth Anniversary of the Link-Belt Company

Fifty years have passed since the incorporation of the Ewart Manufacturing Company, the forerunner of the present Link-Belt Company, in 1875. In commemoration of the fiftieth anniversary, the Link-Belt Company has published an attractive book entitled "Link-Belt 1875-1925."

In this book it is mentioned that the patent of William Dana Ewart, a young implement dealer, from Belle Plaine, Iowa, for the detachable link chain, was dated September 1, 1874.

Late in 1874, when Mr. Ewart came to Chicago with a view to arousing some interest in his "detachable link chain," he succeeded in interesting John C. Coonley, a lawyer, who was then president of the Chicago Malleable Iron Company. As a result a company was duly incorporated in 1875, under the name of the Ewart Manufacturing Company, for manufacturing detachable link chain. In 1876 the Ewart chains were exhibited at the Philadelphia Centennial.

New uses for the invention developed rapidly, and in 1880 the Link-Belt Machinery Company was incorporated "to design, build, and supply accessory parts, and install elevating and conveying machinery employing Ewart Chains," the plant for this company was built in Chicago.

In 1888 the Link-Belt Engineering Company was formed, with a plant in Philadelphia. These two plants found increasing numbers of new uses for the chain, with the result that all three plants continued to grow in size until in 1906 a consolidation of the three interests took place, and Charles Piez elected president.

Mr. Piez is now chairman of the board of directors, and Alfred Kauffmann, formerly vice-president, in charge of the two Link-Belt plants in Indianapolis, is now president of the company.

From the humble beginning in 1875 this company now operates and owns ten large manufacturing plants, with seven shops and warehouses, and twenty-seven branch offices, and its products now include elevating and conveying equipment for all kinds of materials; complete equipment for the handling and cleaning of coal, on the ground and in the boiler house, complete coal tipples and coal-washing plants, sand and gravel-washing and preparing plants, sand-preparing and conveying machinery for the modern foundry, locomotive and crawler type cranes, silent chain drives for industrial plants—in fact, Link-Belt today builds complete equipment for conveying, handling and power transmission.

Allis-Chalmers Branch

Allis-Chalmers Mfg. Co. is opening a branch sales office at Houston, Tex., in charge of R. I. Moore, who was previously located in their Dallas office. Temporary quarters are at 231 Rodgers Building, and after the first of the year the office will be located permanently at 1108 Post Dispatch Building. With the establishment of this office, the company will be able more effectively to serve its many customers in this territory.

The Houston office will be operated as a branch of the Dallas district, of which F. W. Burbank is district manager.

A new district office has been opened by the company in Lima, Peru, in charge of Mr. G. G. Bolton. This office, as well as the one at Oruro, Bolivia, is a branch of the company's office at Santiago, Chile, of which Mr. W. R. Judson is manager. The Oruro office is in charge of Mr. P. G. Gilliard, succeeding Mr. Erling Winsnes, who has returned to the United States.

To Handle Conway Shovels

Announcement is made of the formation of the St. Louis Power Shovel Co., which will manufacture and sell the Conway shovels, formerly handled by the Conveying Weigher Co.

"These shovels," says the announcement, "under the able direction of Hitchcock and Tinkler, are digging the Moffat tunnel near Denver, Colo., in record-breaking time. The National Lead Co. originally developed these shovels in its mines in the Flat River Lead District and is working with us in our effort to make these the most effective power shovels for mining and tunnel work." John L. Clarkson is president of the new company and Douglas C. Corner is general manager with general sales offices at 320 Chemical Bldg., St. Louis, Mo.

Sullivan Office Changes

The Cleveland office of the Sullivan Machinery Company, hitherto at Room 701, Rockefeller Building, has moved to Room 1506 in the same building in order to secure needed additional space. Mr. R. T. Stone is manager.

In order to secure larger space the company has moved its office in Sydney, New South Wales, Mr. R. D. Willets, manager, from Australasia Chambers, 3 Martin Place, where it has been for the past 15 years, to Kembla Building, Margaret Street.

Sullivan at all Western Road Show

Sullivan road and street equipment will be exhibited at the All Western Road Show at San Francisco November 9 to 14, under the direction of Mr. R. P. McGrath, manager of the Sullivan San Francisco Office, 582 Market Street.

The exhibit will include a Sullivan Angle type portable compressor, Class WK-314, 220 cubic feet of free air per minute; Sullivan portable Turbinair hoist in operation; Sullivan rotator, concrete breakers, and clay spaders, also in operation.

New Diamond Drill Catalog

The Sullivan Machinery Company has just issued Catalog No. 80-0, Diamond Drilling for Oil—third edition—80 pages, with cover in two colors.

A large amount of new material has been added to this catalog, relative to new types of diamond core drills for oil field work, which have been brought out in the past two years. It is liberally illustrated with pictures from the field showing different applications of the diamond drills in many parts of the world, and in many different oil fields. An article on the use of the diamond drill in structure testing by Mr. Kay Peters of Tulsa, Okla., is included.

The Sullivan Class FK diamond drills, which have bored to a depth of over 6,000 feet (in India) for heavy duty wildcatting, and the Class CN mounted diamond drill, operated by a Fordson power plant for rapid exploration work in testing structure, are fully illustrated and described. Specimen equipment lists and full information regarding the setting of diamond bits and the operation of the drills in the field are included.

Copies will be sent upon request.

New Portable Hoist Catalog

A new bulletin, No. 76-F, describing Sullivan Turbinair portable hoists, single drum, Class HA-3 and double drum, Class HDA-2, has just been issued by the Sullivan Machinery Co.

These small compressed air hoists have been adapted to a very wide range of industrial, contracting, mining and quarrying uses since their introduction some five years ago. As a time and labor-saving device they have proved of service in such widely different duties as erecting gas holders and oil tanks, trimming coal and rock piles, hauling castings in foundries, operating quarry derricks, lifting the doors of open hearth furnaces, "slushing" ore in metal mines, pulling coal cars underground, unloading box cars of bulk material, etc. While the H. P. of these units is small, their load capacity is remarkably high. On direct lift, with single line, they will handle one ton, or will pull 100,000-lb. car on level track. The Turbinair motor has a remarkably high starting torque as well as excellent sustained efficiency, due to the fact that it uses the air expansively.

Steam turbine hoists are also manufactured and are listed in the bulletin.

A new book entitled "The Construction of Parallel Wire Cables for Suspension Bridges," has just been issued by the John A. Roebling's Sons Company.

This book is beautifully bound, illustrated and printed and is unusual in that it is both a scientific and photographic study of the construction of a modern suspension bridge. The photographs, which are in continuity from the building of the piers to the completed structure, are of the recently completed bridge spanning the Hudson River between Bear Mountain and Anthony's Nose. The text was prepared by the engineers of the Roebling Company and it is said to be the latest data published in connection with the fabrication of bridge cables.

Hyatt Roller Bearing Co. has just released their new bulletin No. 1559. Its purpose is to explain briefly and clearly the method of selecting the correct Hyatt bearing for any given installation in industrial equipment.

With the aid of this bulletin the mechanical engineer can readily choose from the wide range of bearings listed the ones best meeting his needs. A valuable and time saving help is thus offered to both present and prospective users of Hyatt bearings.

General Electric Company, Schenectady, N. Y., has released a new publication, "Automatic Voltage Regulators." This bulletin contains 60 pages of detailed tabulated information, and is known as Bulletin No. GEA-123. It is divided into two sections, the first dealing with Voltage Regulators for Alternation Current Generators, Protective Relays, Voltage Regulators for Direct Current Regulators, and Speed Regulators for Direct Current Motors. Section 2 is devoted to Induction Voltage Regulators for Station Operation and Induction Voltage Regulators for Outdoor Installation.

The duPont Explosives Service Bulletin for November is devoted to Driving Raises, especially emphasizing Drilling and Blasting Practices which facilitate this type of work. The article is by A. E. Anderson, and copies may be had upon request to E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

Link-Belt Company has issued a "Book of Facts for Foundrymen," dealing with Sand Preparing and Conveying Equipment for Foundries. Requests for Book 790, addressed to the Chicago office, will bring a copy to you.

Centrifugal Boiler Feed Pumps is the title of a bulletin recently issued by the Allis-Chalmers Manufacturing Company,

Milwaukee, Wis. It is completely illustrated with cuts and charts, and gives complete information on this type of equipment. Copies may be had upon request to the home office for Leaflet No. 2083.

Bulletin No. 1823, relating to Crushing Rolls (Garfield Type), just has been issued by the Allis-Chalmers Mfg. Company, Milwaukee, Wis. This bulletin contains 30 pages of material devoted entirely to a description of this equipment. It is completely illustrated with charts and photographs of the rolls.

Polyphase Induction Motors, with Cast Steel Frames and Timken Papered Roller Bearings, is the subject of Bulletin 1132 just issued by Allis-Chalmers Mfg. Company, Milwaukee, Wis.

Bennett & Meyer, Inc., West Jefferson, Ohio, have issued a series of bulletins on their equipment. Bulletin W F 1 is devoted to Wood Valves and Fittings, Bulletin M D 1 to Mine Doors and Bulletin W P 1 to Wood Mine Pumps.

Concise Data on Heat Transfer Equipment

A quick reference folder on heat transfer equipment has recently been published by the Griscom-Russell Co., 90 West Street, New York.

This folder briefly describes condensers, heat exchangers, gas and water coolers, evaporators, oil heaters, separators and regulating devices particularly adapted to oil refinery service and includes references to bulletins in which these units are more fully discussed. Copies may be obtained by writing directly to the manufacturers.

George P. Baldwin, general merchandising manager of the General Electric Co., was elected a vice-president of the company at a meeting of the executive committee on November 20. In his new position Mr. Baldwin will have charge of activities connected with the electrification of steam railroads and such other duties as may be assigned by the president. His

new headquarters will be at 120 Broadway, New York City.

Charles E. Patterson, vice-president in charge of finance since 1920, will take charge of all merchandising activities of the company, including the supervision of company supply-houses. He will make headquarters at Bridgeport, Conn.

The accounting department responsibilities of Mr. Patterson will be assumed by the comptroller, S. L. Whitestone.

At the last meeting of the Board of Directors of the Linde Air Products Company, Mr. G. W. Mead, formerly president, was elected chairman of the board. Mr. W. F. Barrett, formerly vice president, was elected to the presidency. In addition to these changes Mr. R. R. Browning was elected vice president in charge of sales activities, and Mr. J. A. Rafferty, vice president in charge of engineering, manufacturing and research.

At a recent meeting of the Board of Directors of the Prest-O-Lite Co., Inc., Mr. M. J. Carney, formerly president, was elected chairman of the board. Mr. William F. Barrett, formerly vice president, was elected to the presidency. Mr. Ralph R. Browning was elected vice president in charge of acetylene sales activities. Mr. R. J. Hoffman was re-elected vice president in charge of Storage Battery and Automotive Divisions.

W. F. James to Head Westinghouse Philadelphia District

W. F. James has been appointed manager of the Philadelphia District of the Westinghouse Electric & Manufacturing

Co., succeeding Mr. H. H. Seabrook, who has been assigned to special duties. Announcement of the changes were made by E. D. Kilburn, vice-president and general sales manager of the Westinghouse Co.

For many years Mr. James has been active in the local sections of the American Institute of Electrical Engineers and the American Iron and Steel Electrical Engineers Society, serving as secretary of each organization. From 1918 to 1919, Mr. James was chairman of the Philadelphia section of the American Institute of Electrical Engineers. In 1921-22, he was president of the Engineers' Club of Philadelphia.

TRAIL SMELTER'S BIG SMOKE-STACK IS SAVING ZINC

THE highest concrete smokestack on the American continent, recently completed at the Trail smelter, British Columbia, was put in commission early in November and is said to be performing wonderfully well.

The foundation for another huge smokestack to take care of the smoke from the lead plant has been constructed.

Not only is the new stack in commission but the huge new electric treater for smoke was also opened up. The treater is designed to recover from the smoke all the zinc that might otherwise disappear through the chimney and 60,000 volts of electric current are required for the treater.

The new lead stack will be a sister stack to the one just completed except that it will have an inside diameter of

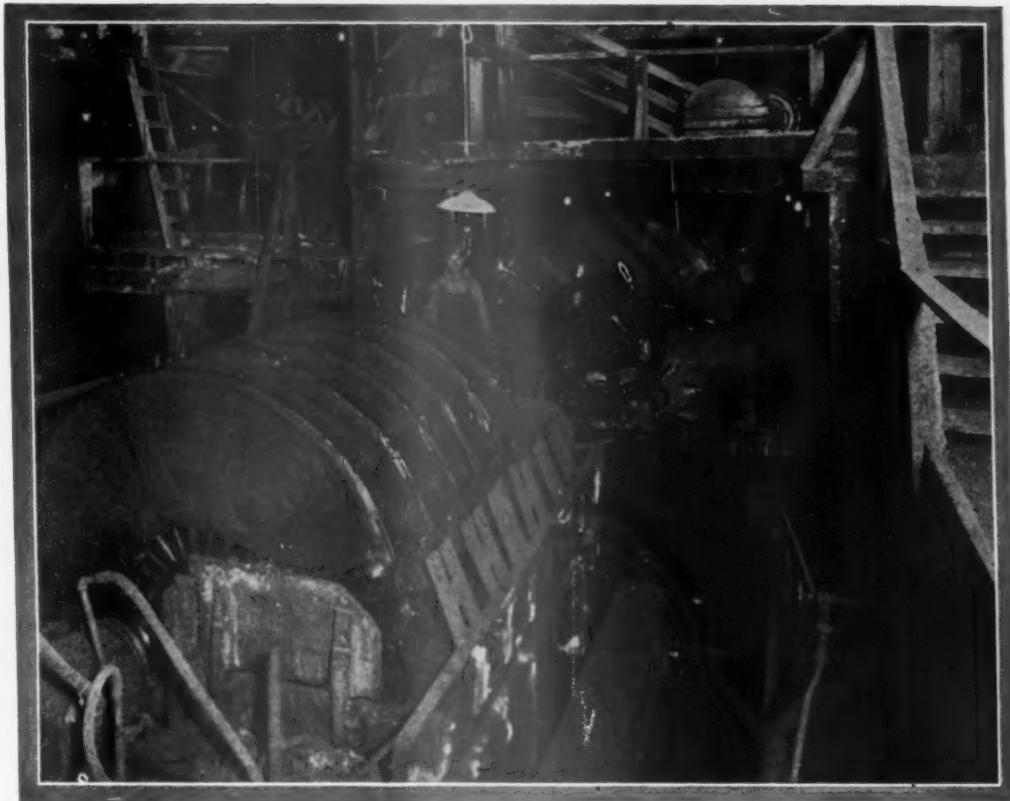
25 feet at the top, somewhat larger than the one just put in commission at the zinc plant and the new treater leading to it will also be somewhat larger than the two others now in use.

The highest smokestack is at the plant of the American Smelting & Refining Company at Tacoma. This stack is built of paving brick, is 572 feet in height and at the top is 24 feet in diameter, at the bottom being 40 feet. Five thousand cubic yards of concrete reinforced by 120 tons of steel rails was required in constructing the foundation.



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American Filters are equipped with hoods which completely enclose the washing sprays, making a clean installation and one which the operators like to work on.

One or more washing solutions can be applied and the quantities regulated to suit the job.

Washing efficiency can be maintained at any reasonable requirement.

Let us show you what the American can do on concentrates of any kind, electrolytic slimes, cyanide slimes—in fact any metallurgical filter problem.

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Three American Filters of acid proof construction are delivering high tonnage per square foot of filter area and low moisture cake. The ability to handle fast settling materials without difficulty accounts for the fact that no agitating device is used in this case. The small building space required and the fact that the average time these units are out of service is only 100 hours per year should make this of interest to most mining men.

Does your problem require the dewatering of two or more different materials? Why not do it on the same filter?

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Oxweld Acetylene Co., 30 E. 42nd
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ACID, SULPHURIC

Irrington Smelting & Refining
Works, Irvington, N. J.

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cago and New York.

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kee, Wis.
Ingersoll-Rand Co., 11 Broadway,
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Sullivan Machinery Co., 122 S.
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Connellsville Mfg. & Mine Supply
Co., Connellsville, Pa.

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AUTOMATIC (Mine Doors, Truck and Electric Switches)

American Mine Door Co., Canton,
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Pa.

BATTERIES (Storage, Gas Welding, Cutting, Dis- solved Acetylene)

Prest-O-Lite Co., 30 East 42nd St.,
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BATTERY SCREENS

Ludlow-Saylor Wire Co., 608 S.
Newstead Ave., St. Louis, Mo.

BEARINGS (Roller)

Hyatt Roller Bearing Co., Harri-
son, N. J.

BELTING (Conveyor, Elevator, Transmission)

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

BELTING, SILENT CHAIN

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

BINS (Coke and Coal)

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

BIT SHARPENERS

Ingersoll-Rand Co., 11 Broadway,
New York City.

BLACK DIAMONDS

R. S. Patrick, Sellwood Building,
Duluth, Minn.

BLASTING POWDER

Hercules Powder Co., 934 King St.,
Wilmington, Del.

BLASTING SUPPLIES

du Pont Powder Co., The E. I.,
Wilmington, Del.

Hercules Powder Co., 934 King St.,
Wilmington, Del.

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Ingersoll-Rand Co., 11 Broadway,
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BLOWPIPES, Brazing, Carbon Burning, Cutting, Lead Burning, Welding, Welding and Cutting

Oxweld Acetylene Co., 30 E. 42nd
St., New York City.

BREAKERS (Construction and Machinery)

Jeffrey Mfg. Co., 958 N. Fourth St.,
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BUCKETS (Elevator)

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Chicago, Ill.

Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

CABLES

American Steel & Wire Co., Chicago
and New York.

CABLES (Connectors and Guides)

American Mine Door Co., Canton,
Ohio.

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CAGE (Safety Appliances)

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Co., Connellsville, Pa.

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Pa.

CAGES

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kee, Wis.

Connellsville Mfg. & Mine Supply
Co., Connellsville, Pa.

G. M. Johnson Mfg. Co., Jeannette,
Pa.

Traylor Engineering & Mfg. Co.,
Allentown, Pa.

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Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

CAR WHEEL BEARINGS

Hyatt Roller Bearing Co., Harri-
son, N. J.

CASTINGS

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Chicago, Ill.

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G. M. Johnson Mfg. Co., Jeannette,
Pa.

CHAINS

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Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.
Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

CHAINS, AUTOMOBILE ENGINE

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.

CHAINS, COAL CUTTING

Goodman Mfg. Co., Halsted St. and
48th Pl., Chicago, Ill.

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

CHAINS, DRIVE

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.

CHAINS, FRONT END

Link-Belt Co., 300 W. Pershing Rd.,
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CHAINS, OILING

Morse Chain Co., Ithaca, N. Y.

CHAINS, POWER TRANS- MISSION

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Morse Chain Co., Ithaca, N. Y.

Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

CHAINS, SILENT (Rocker- Joint)

Morse Chain Co., Ithaca, N. Y.

CHAINS, SLING

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.

CHAINS, SPROCKET WHEEL

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.

Weller Mfg. Co., 1820-56 N. Kostner
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CHILL MILL SCREENS

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CLAMPS (Trolley)

Ohio Brass Co., Mansfield, Ohio.

CLUTCHES

Connellsville Mfg. & Mine Supply
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Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

COAL COMPANIES

General Coal Company, Land Title
Bldg., Philadelphia, Pa.

Lehigh Coal & Navigation Co.,
Philadelphia, Pa.

Thorne, Neale & Co., Philadelphia,
Pa.

Bertha-Consumers Company, Cham-
ber of Commerce Bldg., Pitts-
burgh, Pa.

COAL CRUSHERS

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Co., Connellsville, Pa.

Link-Belt Co., 300 W. Pershing Rd.,
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Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

COAL CUTTER BIT SHARPENERS

Sullivan Machinery Co., 122 S.
Mich. Ave., Chicago, Ill.

COAL CUTTERS

Goodman Mfg. Co., Halsted St. and
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Ingersoll-Rand Co., 11 Broadway,
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Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

COAL HANDLING MA- CHINERY

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

COAL LOADERS

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

COAL MINING MACHIN- ERY

Goodman Mfg. Co., Halsted St. and
48th Pl., Chicago, Ill.

Ingersoll-Rand Co., 11 Broadway,
New York City.

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

Sullivan Machinery Co., 122 S.
Mich. Ave., Chicago, Ill.

Weller Mfg. Co., 1820-56 N. Kostner
Ave., Chicago, Ill.

COAL MINING PLANTS

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New York City.

Link-Belt Co., 300 W. Pershing Rd.,
Chicago, Ill.

COAL SCREENS

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Newstead Ave., St. Louis, Mo.

COKE SCREENS

Ludlow-Saylor Wire Co., 608 S.
Newstead Ave., St. Louis, Mo.

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kee, Wis.
Ingersoll-Rand Co., 11 Broadway,
New York City.

COMPRESSORS, MINE CAR

Ingersoll-Rand Co., 11 Broadway,
New York City.

CONCENTRATING PLANTS

Traylor Engineering & Mfg. Co.,
Allentown, Pa.

CONCENTRATORS (Table)

Allis-Chalmers Mfg. Co., Milwau-
kee, Wis.

CONCRETE REINFORCE- MENT

American Steel & Wire Co., Chi-
cago and New York

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Allis-Chalmers Mfg. Co., Milwau-
kee, Wis.

Ingersoll-Rand Co., 11 Broadway,
New York City.

CONTROLLERS

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Allentown, Pa.



Lift yourself by your boot straps

THROUGHOUT the past year these advertisements have told you about Linde Process Service for Linde users. They have shown how it can help you, whether you have only a comparatively simple job, or whether you want to make the oxy-acetylene process part of your production work with all the managerial and engineering problems that this involves.

Linde Process Service goes even further. Under the title of Procedure Control, instructions are being assembled for every application of the oxy-acetylene process. So, when you ask for help, we shall be able to send you a set of instructions for your particular job. They will tell you how to select your materials, how to instruct your welders, how to set up and carry out the work, and how to test the finished job.

So you can, in reality, lift yourself by your boot straps. Linde Service men will always be available when needed, but, with the aid of Procedure Control alone, you will be able to apply the oxy-acetylene process to your manufacturing problems.

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- ☐ The Dependability of Cast Iron Welding
- ☐ Gas Welded Pipe Joints
- ☐ How Welded Joints Solved Pipe Line Troubles
- ☐ Step by Step in Oxwelding a Pipe Joint
- ☐ Welding Small Tanks by the Oxy-Acetylene Process
- ☐ The Oxygen Lance
- ☐ Welding and Cutting for the Manufacture and Maintenance of Chemical Equipment
- ☐ Step by Step in Gas Welding a Cylinder Block
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CONVEYORS, BELT

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

CONVEYORS, CHAIN FLIGHT

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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

CONVEYORS, COAL

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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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CONVEYORS, SCREW

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Hoffman Bros., Punxsutawney, Pa.

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Foote Bros. Gear & Machine Co., 215 N. Curtis St., Chicago, Ill.

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CRUSHER SCREENS

Ludlow-Saylor Wire Co., 608 S. Newstead Ave., St. Louis, Mo.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Traylor Engineering & Mfg. Co., Allentown, Pa.

CRUSHERS (Gyratory)

Traylor Engineering & Mfg. Co., Allentown, Pa.

CRUSHERS, SINGLE & DOUBLE ROLL

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Jeffrey Mfg. Co., 958 N. Fourth St., Columbus, Ohio.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Oxweld Acetylene Co., 30 E. 42nd St., New York City.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

CYANIDE

American Cyanamid Co., New York, N. Y.
Roeseler and Haslach Chemical Company, 709 Sixth Avenue, New York City.

CYANIDE PLANTS

Traylor Engineering & Mfg. Co., Allentown, Pa.

DECARBONIZING APPARATUS

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R. S. Patrick, Sellwood Building, Duluth, Minn.

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New York Engineering Co., 2 Rector St., New York City.

DRIFTERS, DRILL

Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLING, DIAMONDS FOR

R. S. Patrick, Sellwood Building, Duluth, Minn.

DRILLS, AIR AND STEAM

Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLS (Blast Hole)

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Hoffman Bros., Punxsutawney, Pa.
Ingersoll-Rand Co., 11 Broadway, New York City.
Keystone Churn Drill Co., Beaver Falls, Pa.

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Ingersoll-Rand Co., 11 Broadway, New York City.

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Ohio Brass Co., Mansfield, Ohio.

DRILLS, PNEUMATIC

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Hoffman Bros., Punxsutawney, Pa.
Ingersoll-Rand Co., 11 Broadway, New York City.
Keystone Churn Drill Co., Beaver Falls, Pa.
New York Engineering Co., 2 Rector St., New York City.

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Ingersoll-Rand Co., 11 Broadway, New York City.
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Sullivan Machinery Co., 122 S. Mich. Ave., Chicago, Ill.

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Sullivan Machinery Co., 122 S. Mich. Ave., Chicago, Ill.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Traylor Engineering & Mfg. Co., Allentown, Pa.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

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du Pont Powder Co., The E. I. Wilmington, Del.
Hercules Powder Co., 934 King St. Wilmington, Del.

DYNAMOS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Goodman Mfg. Co., Forty-eighth Place and Halsted St., Chicago, Ill.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.

ELECTRIC HOISTING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

ELECTRIC LOCOMOTIVES

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Goodman Mfg. Co., Forty-eighth Place and Halsted St., Chicago, Ill.
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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Traylor Engineering & Mfg. Co., Allentown, Pa.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.

FLOTATION OILS

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(Reverberatory)
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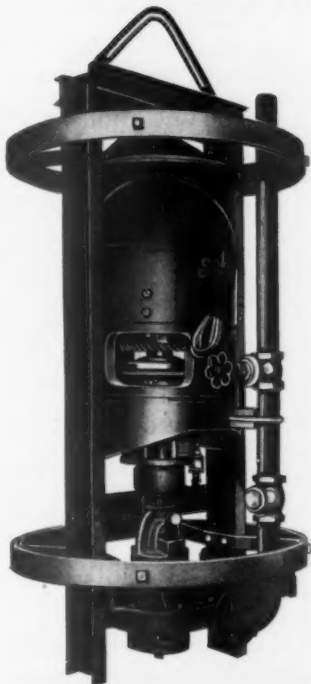
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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
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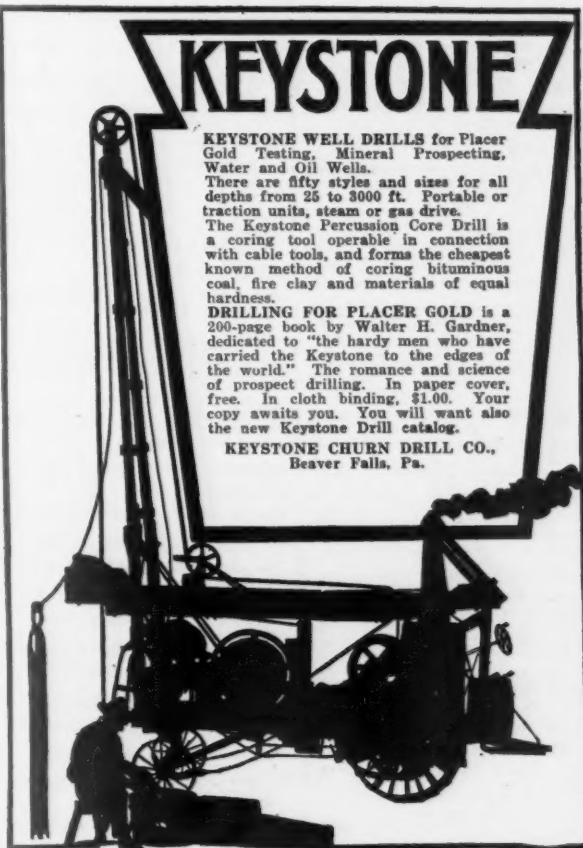
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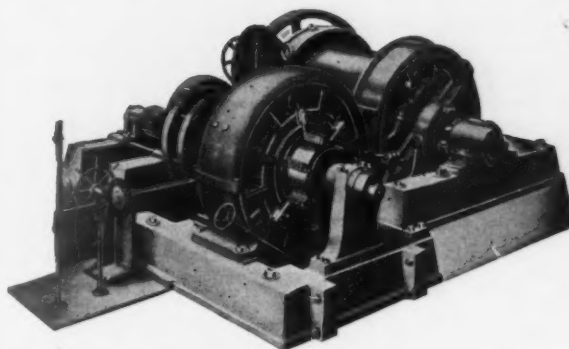
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GOGGLES, WELDING

Oxweld Acetylene Co., 30 E. 42nd St., New York City.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

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INSULATORS (Porcelain)

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Ohio Brass Co., Mansfield, Ohio.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.

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Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.

LOCOMOTIVES, STORAGE BATTERY

Goodman Mfg. Co., Halsted St. and 48th Pl., Chicago, Ill.

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Morse Chain Co., Ithaca, N. Y.
Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Traylor Engineering & Mfg. Co., Allentown, Pa.

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Oxweld Acetylene Co., 30 E. 42nd St., New York City.

PATENT ATTORNEY

John Boyle, Jr., Ouray Bldg., Washington, D. C.

PERMISSIBLES, Explosives

du Pont Powder Co., The E. I., Wilmington, Del.
Hercules Powder Co., Wilmington, Del.

PICKING TABLES

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

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Connellsville Mfg. & Mine Supply Co., Connellsville, Pa.

PNEUMATIC TOOL

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du Pont Powder Co., The E. I., Wilmington, Del.
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Weller Mfg. Co., 1820-56 N. Kostner Ave., Chicago, Ill.

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Oxweld Acetylene Co., 30 E. 42nd St., New York City.

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Hoffman Bros., Punxsutawney, Pa.
Ingersoll-Rand Co., 11 Broadway, New York City.

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Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
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Ludlow-Saylor Wire Co., 603 S. Newstead Ave., St. Louis, Mo.

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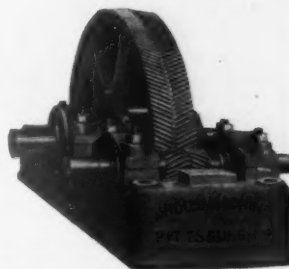
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and inspiration that evolves a new mining method or in the working of a great economic system.

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A list of those actively promoting the movement will be found on the immediately foregoing pages.

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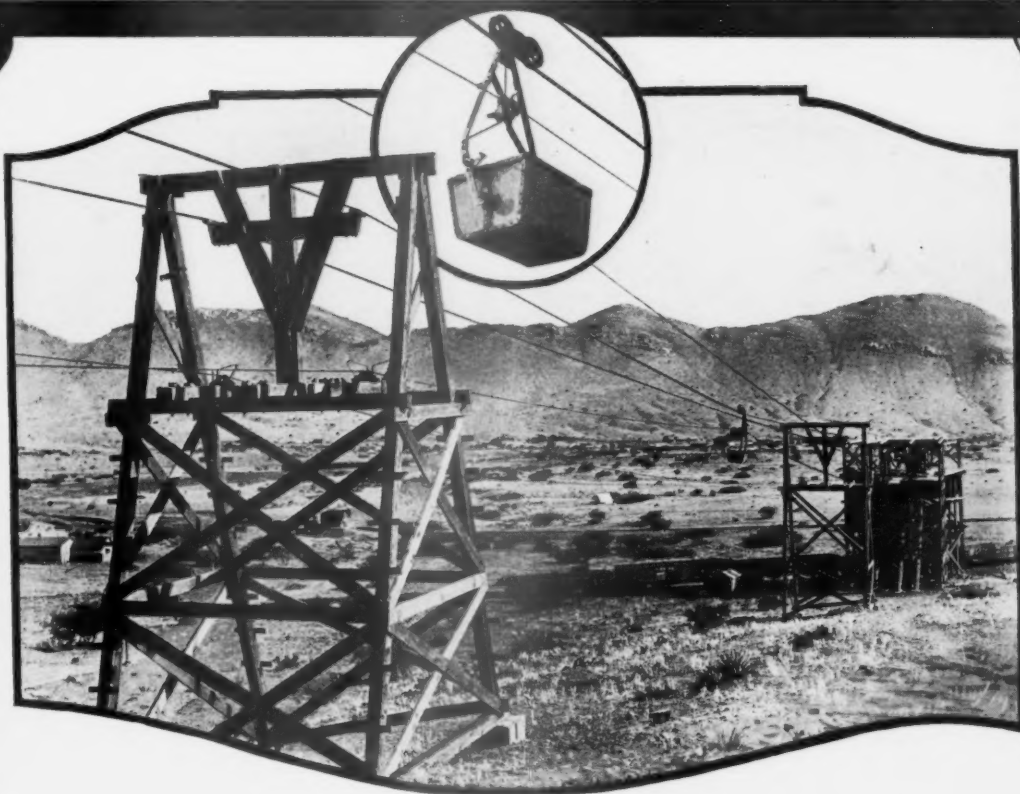
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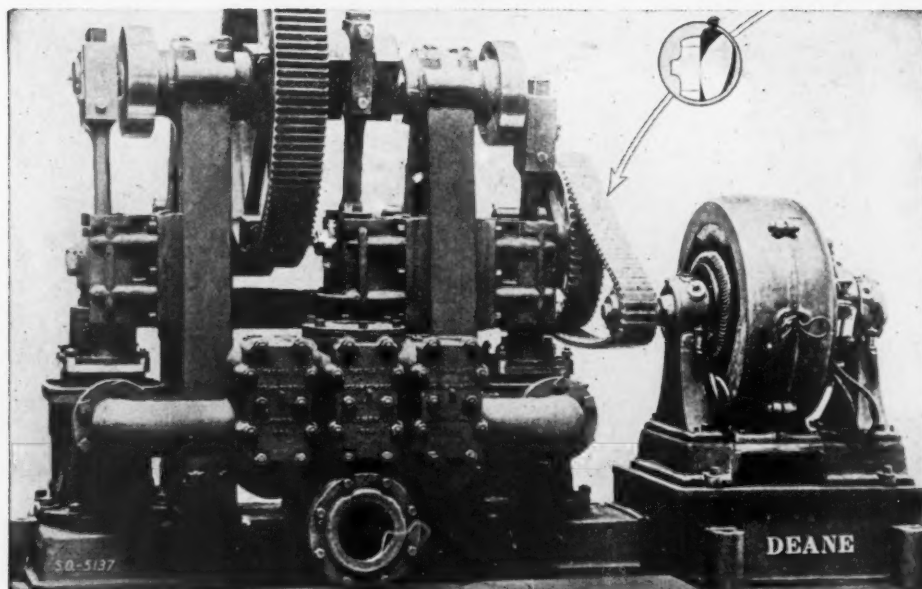
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